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JOURNAL OF PHARMACY

v.33 (1861)

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THE
California College of Pharmacy
A M E R I C A N
JOURNAL OF PHARMACY,

PUBLISHED BY AUTHORITY OF THE

PHILADELPHIA COLLEGE OF PHARMACY.

EDITED BY

WILLIAM PROCTER, JR.

Professor of Pharmacy in the Philadelphia College of Pharmacy

PUBLISHING COMMITTEE FOR 1861.

CHARLES ELLIS,
JOHN M. MAISCH,

ALFRED B. TAYLOR,
EDWARD PARRISH.

VOLUME XXXIII.


THIRD SERIES, VOL. IX

PHILADELPHIA:

MERRIHEW & THOMPSON, PRINTERS,
Lodge Street and Kenton Place,

1861.

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THE
AMERICAN JOURNAL OF PHARMACY.

JANUARY, 1861.

FANCY AND FASHION IN PHARMACY.

BY EDWARD PARRISH AND WILLIAM C. BAKES.

The legitimate enterprise of our progressive age, heightened by the competition resulting from the overcrowding of educated pharmacutists in large cities, continually exhibits itself in some new phase of practice, sometimes destined to be permanently incorporated into the arcana of the profession, but often too ephemeral to deserve more than a passing notice. As the dress and address of our remote ancestry will occasionally loom up amid the ever-changing fashions of modern society, so do we occasionally find the almost forgotten institutions of by-gone pharmacy frequently dressed in the popular guise of new remedies.

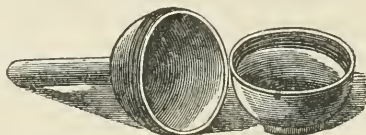
In the present essay, we propose to describe some rare preparations now called for in Philadelphia. Though they may seem to readers in other localities of too trivial importance to occupy a position in the Journal, we are sure they will not be without their use in this particular pharmaceutical centre.

COATING PILLS.

In the last century, the practice was not unfrequently resorted to, of coating freshly made pills with silver or gold-leaf, and in some of the long established pharmaceutical stores in London, facilities are always at hand for finishing pills in this way, when in request. Some very particular people of the old school occasionally bring an ancient recipe, at the foot of which is writ-

ten *deaurantur pilulæ*, meaning, let the pills be gilt, and might not be satisfied with a less splendid surface than that of the gilded pill.

With us, the demand has become quite frequent of late for silver and gold coated pills, several eminent practitioners prescribing this elegant finish, and we have acquired some experience in the manipulation.



The above represents an apparatus we have had turned to order from hard wood for use in this process. In rolling the pills, care is taken to use no dusting powder of any kind, and to have them moderately damp, otherwise we moisten them with a little syrup, and then introduce them into the hollow sphere along with the requisite quantity of silver or gold leaf; a rapid motion is now given to the globe, and in a few seconds the pills are removed with a clear and bright coating. One dozen pills of average size, require one sheet of foil, and larger numbers in the same proportion. Some difficulty is experienced in giving a handsome coating to pills of Quevenne's Metallic Iron, on account of their black color; this can only be obviated by the use of a larger proportion of foil, which may be objectionable as interfering with their solubility notwithstanding its extreme tenuity.

The taste of the pills is of course disguised in proportion to the completeness of the coating; in dispensing, no powder is necessary, the tendency to adhere to each other being obviated.

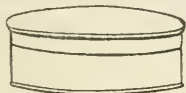
Some of the old recipes direct to use a gallipot laid against the palm of the hand, for coating pills with the foil. We have found two porcelain capsules fitted to each other, the opening at the lips being covered by the thumb, to serve a very good purpose; but there is a decided saving in the use of an apparatus as above figured, any portion of the foil not adhering to one charge of pills will be ready for the next, besides the advantage which is gained by the leverage of the handle.

In what is here said, we have ventured no opinion upon the effect of this treatment upon the solubility and consequent activity of pills. We learn from a physician who has prescribed them, that the conclusion often hastily drawn against their eligibility is not borne out by experience. Another remark needs to be made; not only is the quality of the foil important with reference to the lustre of the coating, but Dutch metal, which is so often substituted for gold foil, is quite unsuitable from containing copper and zinc.

For sugar-coating, our apparatus offers facilities over some other contrivances; the sugar being triturated with gum arabic into a dust-fine powder, and introduced into the spheres, can be readily transferred to the moistened pills, but we believe there is no good way of giving the desirable surface to these "*dragees*" without the application of carefully regulated heat.

DISPENSING.

The mode of dispensing pills has sometimes an importance which is overlooked by pharmacutists. In England, the practice obtains among those who cater to the taste of the wealthy, of sending out pills in vials, which are regularly made and sold by the dealers in Druggists' Sundries, of the proper sizes for one, two, or three dozen pills; these have cork stoppers capped with turned tops of satin or box-wood, and are certainly well adapted to the purpose, especially where pills are deliquescent, or have a special tendency to become dry and hard. The construction of pill boxes has especially engaged our attention of late, from observing the rather unsightly, though otherwise superior description imported from Germany. Improving upon them in style, we have adopted the same mode of construction, and have produced a very superior pill box, such as is shown in the drawing.



Instead of the top and bottom piece being as in the common kind, cut out of such size as to fit into the cylinder, constituting the sides of the box, they are so large as to extend over its edge, on which they are secured by a margin of fancy paper covering the projecting ridge. Every pharmacist of experience must have noticed how often pill boxes are returned with

the bottom or top, or both, loosened and sometimes lost, to the great annoyance of the purchaser, and requiring a new box with every renewal of the prescription; this is obviated by the use of the box now described. A flat shape is not without advantage, being convenient for the waistcoat pocket, and allowing ample space on the top for labelling, which the somewhat lengthy directions occasionally required.

JELLIES.

Jellies made of fixed oils, have the advantage of diminishing the adhesion of these to the mouth, which is the most disagreeable property of this class of remedies. Cod-liver and castor oil jellies, as patented by Queru, of New York, enjoy a large sale, and are much prescribed by physicians; without interfering with this patent, the physician may prescribe jellies of any of the fixed oils or of copaiva, by a recipe somewhat like the following:

Take of The fixed oil, an ounce.

Honey,

Syrup, of each, half a fluid ounce.

Powdered gum arabic, two drachms.

Russian isinglass, forty grains.

Orange flower water, six fluid drachms.

Dissolve the isinglass by the aid of heat, in half an ounce of the orange flower water, replacing the water as it evaporates. Triturate the other ingredients with the remainder of the orange flower water, into a homogeneous mass in a warmed mortar, then form an emulsion by adding the solution of isinglass, stir as it cools and set aside to gelatinize.

This is an opaque emulsion, but possesses all the advantages of this form of preparation. The flavoring ingredient may be changed to suit the taste, bearing in mind the ascertained fact that the bitter almond flavor most completely disguises that of cod liver, and perhaps of most other oils.

WAFER ENVELOPES.

The wafer is a preparation rarely used in this country, but much employed abroad for enveloping doses of medicine, espe-

cially in the form of powder. We have met with no recipe for its preparation in any of the works on pharmacy, and have heretofore obtained only those imported from France.

In the absence of any directions in the books, we have adopted the following process with complete success:

Two sad-irons are warmed to a temperature at which they may be touched without burning the fingers, not so hot as to occasion a globule of water to run off when thrown on the level surface. One of the irons is maintained at a slightly increased temperature by inverting it over the gas furnace; a very little oil of almonds or butter, on a fragment of cotton cloth, is now rubbed over the surface of each iron. A portion of the finest wheaten flour, mixed with water into a smooth batter or thin paste, is now poured on the inverted iron, and the other iron is immediately pressed firmly upon it. After a minute or two the wafer is removed and trimmed into shape. The French wafers are cut into circular disks of about $3\frac{1}{2}$ inches diameter, which appears to be done by the use of annular steel punches. We think the square wafer possesses some advantage for enveloping powders and pills, by folding the corners into the centre. In using the wafer, it is to be moistened by dipping into a tumbler of water, laid on the palm of the hand, the powder or pill dropped in the centre, the edges folded over it, when it may be swallowed like an oyster, without tasting its contents.

SUPPOSITORIES.

“Machine-made Suppositories,” of elegant quality and finish, made of cocoa butter, with a variety of medicinal ingredients, have lately been introduced in this city, and have led to enquiries among our pharmacutists as to the best arrangements for producing them.

To what has been already published by A. B. Taylor, vol. xxiv. p. 211 of this Journal, and in Parrish's Pharmacy, second edit. p. 611, we may add a few practical suggestions, the result of recent experience in this manipulation. The consistence of cocoa butter *alone* is not well adapted to the preparation of an elegant and firm suppository. It is a good basis when combined with a harder and rather less fusible material. We have found wax, in

the proportion of one part to five of the cocoa butter, to answer a very good purpose.

The use of metallic moulds for making suppositories, though no doubt convenient and readily obtained at moderate expense from syringe makers, is quite unnecessary, as the paper cone is convenient, always accessible, and may be adapted to any size required. Perhaps the most suitable weight for a suppository is 25 grains, and there seems no advantage in departing from this standard for ordinary purposes. They are readily introduced when much larger, as indicated in the prescriptions of Drs. Pancoast and S. W. Mitchell, published in the paper already referred to; but on the other hand, they are perhaps equally efficacious when still smaller, the butter of cocoa being merely used as a vehicle, to be increased or diminished at pleasure. The object in having this preparation of an uniform size is to facilitate the construction of the paper moulds, which, when a suppository of 25 grains is prescribed, may be made as follows:

A piece of very stout glazed paper is cut up into oblong pieces, $2\frac{1}{4}$ inches long by $1\frac{1}{2}$ wide, and rolled into a cone, which should be $1\frac{5}{8}$ inches long and half an inch at the base; the free end of the paper is secured by a tip of sealing wax, and at the extreme point of the cone an eighth of an inch is clipped off, and the opening sealed up. The object is next to arrange these cones with the open end in a proper position to be filled with ingredients; this is conveniently done in a shallow vessel of flaxseed—sand is objectionable from its liability, if accidentally thrown into the cone, to produce irritation when the suppository is applied. The butter of cocoa and wax should be melted by a gentle heat, and then the active ingredients added and constantly stirred until it begins to chill, then poured into the paper cones and set aside to harden. The paper should not be removed from the suppository until it has become thoroughly hardened, and by this means it will acquire a clear, polished surface. The time required to prepare a dozen or more suppositories is from half an hour to an hour; the physician should be reminded in advance that they cannot be furnished without some little delay.

BY JOHN M. MAISCH.

It may be considered the duty of the American pharmacist and physician to explore the bountiful flora of our continent, and among the numberless plants indigenous to this hemisphere, to search for new remedies, which may tend to fill a place hitherto vacant, or which may answer as a substitute for more costly exotics. In this connection we shall have to turn our attention likewise to those plants which, though indigenous to foreign countries, have gradually become naturalized to our soil and climate, and grow to perfection without any cultivating care being bestowed upon them. The great variety of soil in a country, stretching from the coast of the Mexican Gulf where the very word of cold is scarcely known, far to the Northern boundaries, where winter reigns supreme for nearly one half of every year, ought to enable us to procure a home for most of the valuable trees, shrubs and plants, no matter whether they require a barren or rich, a dry or moist, a low or hilly or rocky ground. If more *general* attention had been paid to this matter, we might doubtless now count among our naturalized plants many which are of indispensable necessity.

It cannot be denied, that besides, or probably with, such plants as are used for food or in the arts, for culinary or ornamental purposes, a number of weeds have been introduced, which in some instances have become a nuisance to farms and gardens, and cannot now be extirpated. If possible, we ought to turn such weeds to some use, and it is with this object in view I now desire to call attention to an European plant.

Chelidonium majus, Lin., (English, celandine; French, grande éclair or chelidoine; German, Schöllkraut, Schwalbenkraut; Spanish, Celidonia mayor) belongs to the natural order Papaveraceæ, and to the Linnean class and order Polyandria, Monogynia. It is a perennial plant, indigenous to the southern and middle sections of Europe, and extensively naturalized in the northern and middle States of the Union, where it grows in waste places, among rubbish, along hedges, fences and walls.

The root consists of a cylindric or conical caudex, about one inch to an inch and a half in length, of the thickness of a quill

to the size of a finger, frequently hollow or channelled by the rotting away of one side, when growing in rather moist places; it is but slightly branched, except at the lower end, where it is divided into numerous fibres, $\frac{1}{2}$ to 2 lines thick, and frequently 6 to 8 inches in length. When the root has been dried, it is fragile, longitudinally rugose, the caudex of a dirty brown, internally bright red and white, the fibres of a brownish orange, and internally of a whitish color. It is inodorous, and possesses a taste, which is at first bitter and slightly mucilaginous, afterwards persistently acrid and biting. The stem is erect, about two feet high, dichotomously branched above, somewhat pilose. The alternate leaves grow from four to five inches in length, are glaucous beneath, slightly pilose, and pseudopinnate; the lateral segments—usually four in number—are ovate, obtuse, unequally and obtusely incised-serrate, and mostly confluent at the principal midrib; the terminal segment is cuneate-obovate and frequently three-lobed, with the lobes obtusely incised. The flowers occur in umbels of 4 to 8, terminating the solitary peduncles, which grow in the axils of, or opposite to the leaves; the pedicels are bracteate at the base. The calyx consists of two caducous sepals, which are nearly ovate and pilose externally. The four petals are elliptic, entire and yellow. The capsule resembles a pod, is about an inch long and one-tenth of an inch broad, sublinear, swelling somewhat into ridges, one-celled, and opens at maturity by two valves from the base. The numerous roundish-oblong seeds are of a brown or brownish black color, shining, bear an elevated ridge and are affixed to two marginal placentæ.

Celandine begins to flower in May and to ripen the first fruit about July, but continues to bear fruit and flowers until October. The whole plant abounds in an orange colored juice, which exudes from it when wounded. The herb requires some careful attention while drying, to prevent it from turning black; when fresh it possesses a nauseous odor, but is inodorous after drying; it resembles the root in taste, which is first bitterish and somewhat mucilaginous, afterwards acrid and biting. The seeds possess an oily taste, free from acrimony.

In this plant we meet with some of the same constituents that are found in one of our own American plants, which is held in con-

siderable repute in regular and domestic practice, and which belong to the same natural order as celandine. The following comprises the chemical history of the latter plant :

Chevallier and Lassaigne subjected, in 1817, the juice to chemical analysis, but although they supposed the presence of an alkaloid, they were unable to isolate it ; among the inorganic constituents they found organic limesalts, phosphate of lime, nitrate of potassa and chloride of potassium ; also albumen. No better results were obtained by Godefroy in 1824, who supposed the acrid principle to be volatilized on distilling with water. The analysis of Dr. Probst, of Heidelberg, published in 1838, is still the most complete one which we possess of the various parts of celandine.

He proved the presence of chelidonina, chelerythrina, chelidonic acid, and a yellow coloring matter, chelidoxanthin. The largest amount of the first three bodies he found in the root. 40 pounds of the fresh herb yielded him but one grain of chelidonina, which is the bitter alkaloid, and crystallizes best in a free state from a solution in acetic acid. Chelidonic acid resembles citric acid in its behaviour to limesalts. Chelerythrina is the acrid alkaloid of celandine, and was discovered by the same chemist in 1840, likewise in the root of *Glaucium luteum*, another papaveraceous plant, and announced by him as identical with sanguinarina, discovered by Dana. The identity of these two alkaloids was proven by elementary analysis, by Dr. James Schiel, of St. Louis, in 1855.

Chelidoxanthin is precipitated by acetate of lead together with chelidonic acid, and after decomposition by sulphuretted hydrogen the latter is dissolved by water, the former extracted from the sulphide of lead by hot alcohol ; it has a very bitter taste, and, according to Probst, probably imparts to the flowers their yellow color.

Other analyses by Leo Meyer, John, Poley and Reuling agree in their main results with the above, though they were generally not so successful. Lerch found free malic acid and the largest proportion of chelidonic acid at the time of flowering. He ascertained in 1847 that it is a tribasic acid, of the composition 3HO , $\text{C}_{14}\text{H}_2\text{O}_{16} + 2\text{Aq}$; the monobasic salts are of a lemon yellow color, only those with the alkalis are readily soluble in water and crystallizable.

Of the various analyses of chelerythrina or sanguinarina, the latest is by Dr. Schiel, and probably the most correct one; he found $C_{38} H_{16} NO_8$. The composition of chelidonina has been given as $C_{40} H_{20} N_3 O_6$.

The latest discovery of a new constituent has been made by Zwenger, who isolated a new strong organic acid, chelidoninic acid, of the composition $C_{14} H_{11} O_{13}$. The plant it appears, therefore, has the following composition: Chelidonina, chelerythrina (sanguinarina), chelidonic, chelidoninic and malic acid, chelidoxanthin, albumen, phosphate of lime, nitrate of potassa, chloride of potassium; probably, also, an acrid volatile principle, which is dissipated by drying.

To judge from the composition, celandine ought to possess some valuable remedial properties, and indeed it has been held in high repute in Europe for many centuries, and is officinal in most of the European Pharmacopœias. Although the root appears to contain the largest proportion of the alkaloids and some of the acids, and though the root and flowers have been occasionally employed, still the flowering herb is the part usually ordered by the Pharmacopœias. It is gathered during the months of May and June and carefully dried.

According to Orfila's experiments on animals, celandine belongs to the acrid poisons, while in its fresh state, but is more harmless after drying. It is then regarded to contain resolvent, diuretic, diaphoretic and laxative properties, to possess a peculiar action on the liver, the uterine and hemorrhoidal vessels, and in larger doses to exert the influence of the pure acrid remedies in general. It has, therefore, been highly recommended in jaundice and other chronic diseases of the liver, in uterine and hemorrhoidal disorders, and in certain dropsical, scrofulous and venereal affections. Externally it has been employed in some diseases of the eye, in various swellings and pussy gatherings, and the fresh juice against warts, after they have been previously somewhat cut off.

Only the extract has been admitted as an officinal preparation in the various Pharmacopœias. Most of them prepare it of the consistence of a stiff extract; that of Bavaria gives the following directions: The fresh herb is bruised in a stone mortar with a wooden pestle, and expressed; the residue is digested

with some water, at a temperature ranging between 70 and 75° C. (158 to 167° F.) for half an hour or an hour, and then expressed. The mixed liquor is evaporated in a steam bath to a syrupy consistence, then mixed with an equal weight of alcohol, and after 24 hours strained. The residue is again macerated with one fourth of alcohol of .900 spec. grav. and expressed. After filtration, the liquor is evaporated with constant stirring to the consistency of a pill mass. Thus prepared it is of dark brown color, and yields with water or diluted alcohol an almost clear solution; it may be given in doses of from 5 to 15 grains twice or thrice a day.

Rademacher employed a tinctura chelidonii, prepared by digesting the fresh herb with its own weight of alcohol, and employed it in doses of from 15 to 30 drops, two, three or four times a day.

It is frequently prescribed with ammonia, assafoetida, taraxacum, rhubarb, ox-gall, conium, soap, and preparations of antimony and mercury. A favorite prescription of some physicians of my acquaintance has been: Powdered rhubarb and chloride of ammonium, of each one drachm, extract of celandine two drachms; to be made into 120 pills, of which from 3 to 6 are given twice or three times a day.

Philadelphia, Dec. 4th, 1860.

ON TINCTURA ARNICÆ.

BY WILLIAM PROCTER, JR.

It is well known that this preparation is now largely employed by the public as an external application for bruises, and notwithstanding the contempt with which its powers have been spoken of by eminent members of the medical profession it has gradually gained ground among practitioners of medicine and may now be considered as among the probable novelties of the revised edition of the U. S. Pharmacopœia:—

In view of this probability it is desirable that a recipe should be adopted that will merit in all respects the confidence of the physician. Various formulas have been published in which the strength varies from two to four ounces to the pint, with menstrua ranging from diluted alcohol to alcohol of 95 per cent.

The points to be accomplished in the successful preparation of this tincture are that, being for external application, it should

bestrong; next that the menstruum used should be the right solvent for the principles to be extracted; and lastly, that it should not be so alcoholic as to evaporate too rapidly, or to be too stimulating. The following recipe which I have used for many years, was adopted by the revisional committee of the Philadelphia College of Pharmacy, and is worthy of attention.

Take of Arnica Flowers, six ounces,

Alcohol,

Water, of each a sufficient quantity.

Mix three parts of alcohol .835, with one of water, and having sprinkled the flowers with a small portion to prevent dust, bruise them thoroughly until fit for percolation, then pack the arnica in a percolator, and pour on the menstruum so that it shall pass slowly until two pints of tincture are obtained.

This tincture has a dark greenish brown hue, quite different from that made with alcohol alone, a decided odor of the drug, and its activity in full, as I had occasion to learn from the accidental swallowing of a teaspoonful of it by a lady, who took it instead of Warner's cordial—the symptoms of poisoning (as stated by the authorities) being rapidly manifested.

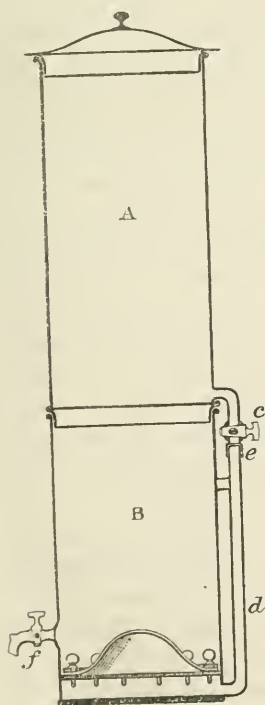
ON SOME PHARMACEUTICAL APPARATUS.

By WM. R. WARNER.

It has occurred to me that the pharmacist is illy supplied with cheap and efficient means of conducting many processes and operations which it would appear to be his duty to perform. We rely upon the manufacturer for the supply of preparations which the pharmacist should prepare himself, if not as a duty, at least as a matter of pecuniary interest or pastime. But the want of appropriate apparatus within our reach, well adapted to our purposes, falls greatly in the way of officinal manufacturing; such as may properly belong to the scope of ordinary shop duties. While we believe there is a great deficiency in these aids, there is much room for improvement in processes and the means of conducting them, and proportionably as we can avail ourselves of these facilities we are able to perform our work better. It certainly detracts from our scientific claims if the necessities of the case do not stimulate invention to relieve our wants, whilst ingenious manufacturers prompted by the demand, exert themselves to invent apparatus and discover

processes to create a supply. I am not prepared to censure the manufacturer who thus subserves wants which our own ingenuity should supply, because he is prompted only by pecuniary interest, as has too often been done. It is true that we do not labor under the same necessities as the great Davy, Dalton and others, to make use of cups, vials and tobacco pipes, etc., but we must acknowledge a deficiency of such certain means as I have alluded to; we must charge ourselves with a want of ingenuity and neglect of interest; and if we cannot see our interests involved, or are not impelled by the many obvious reasons to do so, we are not scientific pharmacutists, but mere merchants.

With these preliminary remarks I will claim the attention of the reader to two pieces of apparatus which in my hands have proved highly efficient and useful. The first is designed for filtering fixed oils; the second, for condensing vapors in the distillation of watery, alcoholic or ethereal liquids.



The *oil filter* consists of an upper cylindrical tinned iron vessel A, about 22 inches high and ten inches in diameter, with a flanch rim soldered on the bottom, of rather less diameter, and about an inch wide, so as to fit firmly into the open top of another cylindrical tin vessel of the same diameter and eighteen inches high. The upper vessel is furnished with a lid, and with an L shaped tube and stop cock *c* which penetrates the side close to the bottom and fits into another tube *d* at *e* which tube opens into the lower vessel close to its bottom, and is secured to the side of B by a strong tubular stay.

The filtering medium is a cone of hat-felt, projecting upwards from near the bottom of the lower vessel. The manner in which this important part of the apparatus is arranged is as follows: just above the bottom on the inside a tinned iron ring of the same diameter as the inside of the vessel, an inch wide and a quarter of an inch thick, is securely

soldered to the sides forming a projecting ledge about three quarters of an inch above the bottom. The ring is penetrated with six holes, with threads cut in them, in which fit pointed thumb-screws with shoulders. On this ring fits a similar tinned iron ring of slightly less diameter furnished with corresponding holes of such size that the thumb-screws pass easily through them as far as the shoulders which thus are capable of binding the two rings closely together, when screwed down. The felt filter having been cut to the diameter of the vessel, is slipped down so as to rest evenly upon the lower ring; the upper ring is then placed upon it carefully so as to avoid any overlapping of the felt; and then the points of the thumb-screws being pushed through the felt are securely screwed into the lower ring which binds the rings so closely as to make a tight joint. The lower vessel is also provided with a stop-cock at *f* to draw off the filtered oil when it has accumulated sufficiently.

The apparatus is used in the following manner. The stop cock *c* being closed, the upper vessel is fitted in its place, and the tube joint *e* rendered tight by wrapping twice around it a strip of isinglass plaster well moistened. When this is dry, the upper vessel is filled with the crude oil, and the stop-cock *e* opened that the oil may flow into the open space below the filter. To facilitate the passage of the oil, the apparatus should be supported above a stove, or other source of heat, so that its temperature may rise to 120 degrees; and in the case of castor oil this is really necessary owing to its consistence. As the filtered oil accumulates in B, it should be drawn off, as any large amount greatly retards the process by decreasing the force of the column bearing on the filter. The fact that the filtration occurs from below upward is esteemed an advantage as the tendency of the impurities is to settle away from the filtering surface and not to accumulate upon and clog it.

An instrument of this size properly attended should filter a barrel of oil in a day with ease, and the whole arrangement is so symmetrical that it may stand in the shop without offending the sight or interfering with other operations. The oil may be drawn from the vessel B directly into bottles if desired, or by means of a gum tube drawn over the mouth of the cock it may be conveyed into any large receptacle placed near it.

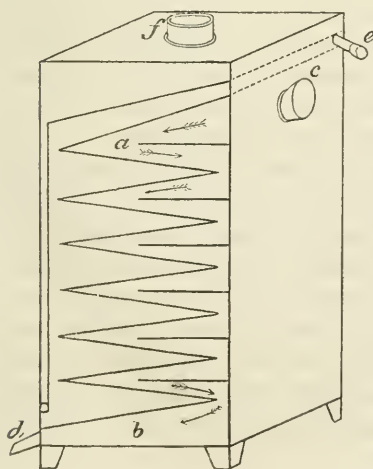
Believing that the utility of an efficient and convenient ap-

paratus to facilitate the filtration of fixed oils, syrups and viscid solutions would be readily acknowledged, and would fill a desideratum arising from the necessity for such an arrangement, has led me to this effort to supply it. We have had hitherto no arrangements or apparatus well adapted to our wants in this respect, and the simple *filter bag* or *Hippocrates' sleeve*, though good enough for some purposes, is as primitive as the name might suggest, and has been mostly the only means employed by wholesale dealers and others, some of whom have several apartments for the filtering of castor oil, and extensive arrangements for heating in order to render more fluid the oils which are filtering in these apartments.

The invention which I have endeavored to illustrate embraces the essential ideas of filtration upwards, the employment of the law of liquid pressure, and the application of heat to increase fluidity of substances filtering, the importance of all of which I think is apparent and requires no comment.

Some eight years since Prof. Procter invented an apparatus, as he informs me, for filtering oils, which embraced the principle of upward filtration, of this arrangement, but none of its other advantages.

The entire exclusion of dust, which the exposed oils so readily catch, is effected, and the oxidation of them from protracted and tedious filtering by the ordinary method, are all prevented by this apparatus.



The Condenser (or "jack in the box," as our smith calls it) is especially applicable to the condensation of alcoholic vapors. It consists of a square tinned iron box of twice the height of its diameter with a canister like flanch and lid at the top. A few inches below the top is a diaphragm of tinned iron soldered in diagonally so as to be lower at one corner than at the other three. At this lowest corner a vertical tube is soldered in the diaphragm which descends in that

corner of the box nearly to a lower diaphragm. Between this diaphragm and the upper one the space is separated into two equal parts by a series of transverse, partial partitions or plates, meeting alternately at acute angles within an inch of the opposite sides of the box, so as to separate the water for condensing, which passes down through the tube and gradually fills one side, from the condensing surface and space for the vapor which enters at a conical neck *c* just below the upper diaphragm. The condensed liquid escapes below the lower diaphragm at the side opposite from the neck. As the number of zigzag plates may be increased, the amount of condensing surface may be greatly increased, and to render the action of the apparatus yet more efficient, a series of plates are soldered to the side penetrated by the neck so as to extend into the condensing spaces, but not to reach the partitions, and thus compel the vapor to take a zigzag course from *a* to *b* as indicated by the arrows, in which it is brought into contact with every part of the condensing surface. As the cold water reaches the lower surfaces first, and the water in contact with the upper surfaces gets heated most, it follows that in its descent the vapor will meet with surfaces increasingly cold until they are effectively reduced to the liquid state and run out at the exit *d*. The hot water escapes at *e*, and by admitting a strong current of cold water at *f* the amount of condensing power is really surprising.

This apparatus is not unsightly, occupies but a small space, and may be lacquered or painted, which to some extent will promote radiation of heat from outer surfaces. The thin conducting material of which it is constructed admits of rapid transmission of heat from surface to surface. Its essential merit is its condensing power, which I will illustrate as follows:

If this condenser be 24 inches high, and 12 by 13 in diameters, with twenty four 12 inch partitions, (occupying in all slightly more than two cubic feet), it will give a condensing surface of 28 square feet; or 4032 square inches. Now compare this with the ordinary worm condenser of one inch diameter, and 72 feet long, 6 feet coil and 4 inches fall; filling a space 3 by 5 feet will give but 2592 square inches. It is therefore apparent that this apparatus, occupying slightly more than two cubic feet, is capable of doing the work of a worm 112 feet long. In conclusion

I will state, that by attaching the apparatus to a hydrant by a caoutchouc tube, and the opening *d* to a large receptacle, a large operation may be performed without any attention to the condensing arrangement after it is set fairly at work.

Philad. Dec. 10th, 1860.

ON AN ADULTERATION OF CARMINE.

By J. M. MAISCH.

That adulterators are everywhere busily engaged in the sophistication of many articles of daily use, is well known, and this business will continue to be a profitable one so long as the purchaser prefers to rely on other people's assertions, instead of examining for himself, and thus becoming convinced of the purity of the article which he may wish to buy. This nefarious business is not confined to America, as will be admitted by all who are in some measure acquainted with the commerce in foreign countries; and if a proof was demanded, we may simply point to the journals, whose columns occasionally take notice of some gross fraud. The object of these publications is obvious, to put the buyer on his guard, and make him acquainted with the various substances used for adulteration. If every one would spend a few moments in chemically investigating a newly bought article, return the same if adulterated, and report to some influential journal the results, a more effectual stop would be put to sophistication than could be effected by the most stringent laws.

The paper by J. Attfield, copied on page 361 of the *American Journal of Pharmacy*, 1860, is a very interesting one. I was, indeed, surprised at the extent of the sophistication of carmine by chrome red and vermillion, carried on or countenanced by *leading* drug establishments of London; though it cannot be justified, it is possible that the specimens examined were the low-priced commercial varieties.

Within the last ten years, I have examined a number of finer qualities of carmine occurring in our commerce; the test employed by me was treatment with cold liquor ammoniæ, which will dissolve pure carmine. This test I believe to be sufficient for all practical purposes. In most instances I found

the carmine to be perfectly soluble ; but as I do not know from what manufacturers the article had been obtained at different times, I cannot say to what extent its sophistication is practised among us.

Lately, the residue from two ounces of carmine No. 40, left after treatment with ammonia, was handed me for examination. It settled upon the filter to a stiff mass, which, with great difficulty, was deprived of nearly all its color and weighed, after drying, 500 grs. It was free of lead and mercury, insoluble in cold water, soluble in hot water and gelatinized on cooling. A solution of iodine produced a deep blue color, and when incinerated in a crucible, it left a charcoal which burned with difficulty leaving $\frac{1}{2}$ per cent. of ashes. The carmine was adulterated with about 57.14 per cent. of starch.

It appears from this, that our sophisticators understand their business better than their London brethren ; the latter employ some coloring matter which is at least worth some trifle per ounce, while the former manufacture for the same amount of money from $\frac{1}{4}$ to 4 lbs. of carmine.

Philadelphia, Dec. 10, 1860.

BITTER WINE OF IRON.

BY WILLIAM PROCTER, JR.

Under this caption a preparation was introduced into use in this city many years ago, by the late Dr. Physic, which was made from cider, iron filings, orange peel, and ginger, and is yet kept by several apothecaries :

If we are rightly informed, this preparation was first made by Frederick Brown of this city. The kind of cider proper for this purpose, is that known as hard cider, a strong cider decidedly acid from the presence of malic acid.

The following is the recipe :

Take of Iron filings, three ounces.

Ginger, bruised,

Gentian bruised, each an ounce.

Orange peel bruised, half an ounce.

Strong old cider, a pint.

Macerate in a bottle loosely corked, for two weeks or longer, then express and filter for use.

A reaction occurs between the iron filings and the acid of the cider, resulting in the formation of malate, and perhaps some acetate of protoxide of iron, with the evolution of hydrogen gas, which swells up the ingredients, and requires that the maceration should be conducted in a bottle of twice the capacity of the ingredients.

This preparation has a dark almost black color, very bitter aromatic taste, and is a good, though not an elegant chalybeate, in the dose of a teaspoonful.

BITTER WINE OF IRON.

(*Hubbell's Recipe.*)

For some time past, Mr. O. S. Hubbell, of Philad., has prepared a "Bitter Wine of Iron," which has been much prescribed by several physicians. The peculiarity of this preparation is, that it consists of iron and cinchona, and yet is free from any inky taste or appearance, is perfectly transparent, of a light brown color, not very different from that of sherry wine, and a bitter, not disagreeable taste.

The label claims for it the presence of citrate of the magnetic oxide of iron, as the ferruginous ingredient.

On applying to Mr. Hubbell for the recipe for publication, he freely gave me sufficient data with which to make the following formula :

Take Citrate (of magnetic oxide) of Iron, 128 grains.

Precipitated extract of Calisaya bark, 256 grains.

White wine (sherry), a pint,

Curaçao (the best), five fluid ounces and a third.

Dissolve the precipitated extract of bark in the wine by aid of a sufficient quantity of citric acid, then add the citrate of iron, filter the solution, and add to it the Curaçao and mix.

The precipitated extract of bark employed by Mr. Hubbell is not the commercial extract, or yet that of Wetherill, or of Ellis, but is made by himself, by a process based on that of Mr. Herring, of London, for the manufacture of quinine.

Any quantity of Calisaya bark is treated with a solution of

caustic soda, (2 parts to 100 of water,) until it has removed the coloring matter, kinic and tannic acids and extractive matters. The residue is washed with water, dried, and extracted with alcohol till exhausted, and the alcohol distilled off so as to obtain an extract. The extract consists almost wholly of quinia and cinchonia, and is free from tannin, and though not soluble in wine alone, becomes so by aid of citric acid.

The dose of this preparation is a teaspoonful.

Now it must be apparent to any one who reflects on what occurs in the preparation of this extract, that there is nothing medicinal in it except quinia and cinchona. If so, why not use the officinal salts of these bases in the proportion that they occur on the average in *Calisaya* bark, which is about five of quinia to one of cinchonia, making a due allowance for inert matter present?

As regards the quantity of these salts that should be employed in such a substitution, it could only be determined by an analytical examination of the Extract itself. If Ellis's Precipitated Extract of *Calisaya* will not blacken the persalts of Iron it may very properly be used instead of the Extract of Mr. Hubbell by Herring's process, but of its quality in this respect I am not aware.

A wine of citrate of iron and quinia, made by dissolving 16 to 24 grains of citrate of iron and quinia, in a fluid ounce of sherry wine, has been prepared by several apothecaries; and in the last edition of Parrish's Pharmacy a formula for Bitter Wine of Iron is found, analogous to that of Hubbell's, Ellis's Precipitated Extract of *Calisaya* being employed.

ON COMMERCIAL IRON BY HYDROGEN.

BY JNO. M. MAISCH.

The superiority of iron reduced by hydrogen consists in its fine division, its ready solubility even in weak acids and its purity, particularly in the absence of sulphur and carbon, which evolve sulphuretted or carburetted hydrogen, when the preparation is submitted to the influence of diluted acids. These gases are of course likewise evolved on the introduction of the iron

into the stomach, and cause unpleasant eructations accompanied by the disagreeable odor of the gaseous compounds. For the above reasons, iron reduced by hydrogen has been admitted into various Pharmacopœias, and the iron filings and iron powdered by mechanical means, is now with us, for internal exhibition, entirely discontinued.

It would appear to be of great importance to have this powder in a pure state; the difficulties which are connected with its preparation are such as to prevent nearly all our pharmacutists from making it for their own use, and to rely on the products as furnished by the manufacturing chemists. Magnus' test for this reduced iron (*Am. Jour. Pharm.* 1859, 255) to apply a lighted match, when it should readily burn to the sesquioxide, is sufficient to distinguish it from ordinary powdered iron, and it may likewise be considered a test for its entire reduction, if it ignites readily and burns rapidly, until the whole mass is converted to the oxide of a uniform reddish brown color. But even this behaviour will not prove its absolute purity, as will be shown below.

A sample of reduced iron of a rather black color induced me to procure various samples of this preparation, none of which were entirely soluble in diluted hydrochloric acid, some even requiring prolonged digestion in nitromuriatic acid; but all ignited by a match more or less readily, and burned partly or wholly to products from a brownish black to a reddish brown color. Of the eight samples which I thus examined, the origin of three could be ascertained, and I concluded to ascertain their purity by analysis. They were all free from lead, copper, zinc and similar metals.

No. 1 was of American manufacture, possessed a rather black color, which appeared brownish gray when a small quantity was rubbed upon white paper; it ignited with some difficulty by a lighted match, and burned slowly and incompletely, yielding a product, a portion of which had a reddish black color, while the remainder was apparently unaltered and could not be ignited. It dissolved partly in cold and heated muriatic and nitric acid, entirely in cold nitromuriatic acid by prolonged contact, but instantly when heated; another portion from the same bottle, however, dissolved with less facility in

the heated acid ; the evolved hydrogen had the odor of sulphuretted hydrogen and turned sugar of lead paper black.

No. 2 of American make had a blackish grey color, somewhat lighter when rubbed on white paper ; it ignited with great facility and burned rapidly, yielding a product of a purplish black, with a small portion of the original color, the latter igniting as soon as touched with the match. Cold and boiling nitric and hydrochloric acids dissolved a portion ; nitromuriatic acid when cold, did not dissolve all, but after some boiling yielded a perfectly clear solution. The gas evolved from digesting it with diluted sulphuric acid had a slight odor of carburetted hydrogen and was free from sulphhydric acid.

No. 3 of French origin had a grey color, lighter than No. 2, and appeared similar to it when rubbed on paper ; it ignited very readily and burned rapidly and entirely to a dull reddish brown oxide. It was but partly soluble in cold or boiling muriatic, nitric and nitro-muriatic acid, but dissolved in the latter by repeated boiling with fresh portions. The gas, evolved by diluted sulphuric acid, had a strong odor of carburetted hydrogen and likewise contained some sulphuretted hydrogen.

Ten grs. of each of the three specimens were dissolved in nitromuriatic acid, evaporated to near dryness, redissolved in water and precipitated by ammonia ; the precipitate was well washed, dried, incinerated and weighed, after deducting the ashes of the filter. Ten grs. of each specimen were subjected to red heat, repeatedly moistened with nitric acid and heated, until they ceased to gain weight. The results were as follows :

	No. 1.	No. 2.	No. 3.
Weight of $\text{Fe}_2 \text{O}_3$ by precipitation	11.8	12.75	12.8 grains.
“ “ “ heating	11.55	12.6	12.9 “

The sesquioxide of iron obtained from 10 grs. of pure iron, ought to have weighed 14.286 grs. whereby a deficiency of 2.486, 1.536 and 1.486 grs. respectively is shown. The precipitated and incinerated oxide of iron as obtained above, is equivalent to 8.26, 8.89 and 8.96 grs. of pure iron ; if the small percentage of carbon and sulphur be neglected, or rather calculated as oxygen not entirely removed, the specimens would contain 1.74, 1.11 and 1.04 grs. O. If this oxygen was retained

as the magnetic oxide $\text{FeO} + \text{Fe}_2\text{O}_3$, the specimens contain of this compound 6.3075, 4.024 and 3.77 grs. consequently an available amount of uncombined iron of 3.6925, 5.976 and 6.23 grs. These last calculations are not quite exact, because the sulphur and carbon, although their amount is small, ought to have been deducted from the oxygen, whereby the magnetic oxide would have been lessened and the iron slightly increased. Taking everything together, No. 2 is to be preferred, as yielding the least odorous gas on dissolving, and nearly the largest percentage of pure iron.

But it will be seen, that if the above samples fairly represent the reduced iron in our market, we are far from having it as pure as it ought to be. The sulphur is easily accounted for by negligent washing of the precipitated oxide of iron; but where does the carbon come from? Professor Wöehler states that the hydrogen evolved from iron and sulphuric acid, may be employed for deoxidation without disadvantage, it yielding a product quite as pure as when evolved from zinc; the carbon, therefore, could scarcely have any other origin but the dust, which cannot probably be effectually excluded from the oxide during the process of washing, when made on the large scale.

The presence of sulphur, however, is more objectionable even than a small percentage of carbon, and the manufacturers will therefore have to turn their attention to the careful washing out of the sulphates, or else prepare the oxide in a manner where such a contamination is impossible.

In this connection, it may be well to again direct attention to the researches of Wöehler, as published in the Amer. Jour. Pharm. 1856, 139. His method for obtaining a pure sesquioxide is unobjectionable, at least so far as the result is concerned; and as the oxalate of iron yields pure iron in a current of hydrogen at a lower temperature than any other preparation, this may be of special usefulness. The quantity of the ferrous oxalate will be increased, if, instead of oxalic acid, the oxalate of soda is employed for precipitation, but a careful washing will then be indispensable. The increase of cost by the use of oxalic acid or an oxalate, I should suppose, ought to be counterbalanced by the less trouble and the easier reduction, consequently by a purer preparation and an increased yield.

Philadelphia, Dec. 1860.

ON METAMORPHIA, A NEW ALKALOID OF OPIUM.

BY DR. G. C. WITTSTEIN.

The following eight alkaloids have until the present time been found in opium :

	Formula.	Equiv.
Morphia	$C_{34}H_{19}NO_6$	285
Narcotina	$C_{46}H_{25}NO_{14}$	427
Codeina	$C_{36}H_{21}NO_6$	299
Thebaina (Paramorphia)	$C_{33}H_{21}NO_6$	311
Narceina	$C_{46}H_{29}NO_{18}$	463
Pseudomorphia	$C_{27}H_9NO_7$	241
Opiania	$C_{66}H_{36}N_2O_{21}$	628
Papaverina	$C_{40}H_{21}NO_8$	339

I have obtained from opium an organic body of basic properties, differing from the eight just named, and which is therefore the ninth alkaloid. Being in its behaviour nearest allied to morphia, I propose for it the name of metamorphia, which would be even more justified, if it could be proved, that the alkaloid is a product of decomposition of morphia.

Mr. Scharf, pharmacist in Munich, attempted to prepare morphia by Mohr's method with lime from the residue of laudanum, but hesitated to dispense the product, as it was not precipitated by ammonia from its solution in acids. The dirty yellow needles, rather less than a drachm, were handed to me about two years ago, but not until last summer did I find time for investigation. By recrystallization and drying, 35 grs. of fine white silky needles, resembling wavellite, were obtained; they were free of lime and consisted of the hydrochlorate.

They were dissolved by two parts of boiling water, 25 p. water at ordinary temperature; the solution is neutral, and has a strong and purely bitter taste. 90 per cent. alcohol dissolves at ordinary temperature $\frac{1}{45}$ at the boiling point half of the salt, which is insoluble in ether. The salt is rapidly and completely dissolved by alkalis and their carbonates, colored blue, somewhat greyish, by sesquichloride of iron, and dirty red when heated with concentrated sulphuric acid. The solution produces a reddish yellow flocculent precipitate with terchloride of gold, a light yellow flocculent precipitate with bichloride of platinum,

both soluble in water, a white flocculent precipitate with bichloride of mercury, and a yellowish white turbidity with tannic acid.

5 grs. of the air dry salt, after heating to 100° C. weighed 4.424 grs. and yielded 2.125 grs. AgCl, equivalent to .525 grs. Cl and to .540 grs. HCl, or 12.211 per cent. Supposing the salt to be anhydrous, its equivalent weight must be 262, or, with the exception of pseudomorphia, lower than any other opium-alkaloid.

The alkaloid cannot be separated by macerating the hydrochlorate with an excess of carbonate of silver; but it was obtained free by precipitating exactly with sulphate of silver, and macerating the precipitate with carbonate of baryta; the aqueous mother-liquor contained traces of the alkaloid with some baryta, apparently a combination of both. The alkaloid was extracted from the residue by alcohol, and after evaporation obtained in hard, flat prisms, aggregated in star-like groups. 15 grs. of the air-dry salt yielded nearly 8 grs.

Rapidly heated, the crystals fuse to a colorless liquid, which turns brown and black, and evolves alkaline vapors; when slowly heated, the crystals become opaque at 100° C. (212° F.), greyish-brown at about 130° C. (266° F.) and are blackish-brown at 225° C. (437° F.), and fusion takes place at a still higher temperature. The alkaloid dissolves in about 6000 parts of cold, and 70 parts of boiling water, in 9 parts of boiling and 330 parts of cold 90 per cent. alcohol; this latter solution possesses a sharp bitter taste and a slight alkaline reaction. It is insoluble in ether, rapidly soluble in potassa, somewhat less in ammonia; also in alkaline carbonates, particularly when aided by heat.

Concentrated sulphuric acid produces a faint and transient coloration, and a solution possessing a faint greyish-brown tint. Nitric acid of 1.33 sp. gr. instantly colors the alkaloid orange red, and dissolves it with a yellow color. A concentrated solution of iodic acid added to the aqueous solution of the alkaloid, gradually causes a yellowish color and a purplish color to starch-paper suspended above it. The aqueous solution is not disturbed by sesquichloride of iron, is soon rendered turbid and greyish-black by nitrate of silver, and produces with

terchloride of gold gradually a yellowish turbidity (not a blue solution like the aqueous solution of morphia) increasing to a brownish flocculent precipitate.

It will be seen that the new alkaloid has some reactions in common with morphia, codeina and pseudomorphia. An elementary analysis could not be made, owing to the insufficiency of the remaining pure salt.—*Wittst. V. Schr.* ix. 481-489.

J. M. M.

CHEMICAL RESEARCHES ON MANNITE AND MANNA.

By DR. REINHARD BACKHAUS.

From the inaugural dissertation of the author, as published in Buchner's N. Repert. 1860, 289-299, we make the following extracts :

The non-reduction by mannite of an alkaline solution of oxide of copper, is the best test for the purity of the former ; this has been observed by Berthelot, who, however, does not mention the behaviour of mannitan to such a solution. Mannitan was prepared by passing dry hydrochloric acid into mannite suspended in alcohol, until a brown solution had been effected ; it was heated, neutralized with carbonate of lead, evaporated, exhausted with strong alcohol, re-evaporated, and after redissolving in alcohol, treated with animal charcoal, filtered and evaporated to a syrupy consistence. Diluted and concentrated solutions of this mannitan deoxidize the copper solution.

100 grms. chemically pure mannite, dissolved in 250 grms. water and heated slightly with 250 grms. nitric acid of 1.32 sp. gr., did not separate any mucic acid on cooling, which will be formed if the mannite has not been entirely purified from the mucilaginous body of manna. By diluting with water and digesting for twenty-four hours at 60° C. (140° F.), the saccharic acid is destroyed, and after half neutralizing with potassa and evaporating, only nitrate and binoxalate together with some acid saccharate of potassa, crystallized out, but no bitartrate. Experiments with 300 and 500 grms. had the same result.

But inasmuch as tartaric acid, according to Liebig, appears to be formed from saccharic acid, it is possible to obtain the former by operating on a large quantity of mannite.

If platina-black is made into a paste with a concentrated solution of mannite, the mixture assumes at a moderate heat, after several days, a peculiar odor, resembling valerianic acid; in oxygen, carbonic and acetic acids are formed; but by active oxygen, a fixed acid is produced which yields a precipitate with acetate of lead, and was isolated as a brown amorphous mass.

One part of mannite was distilled with 30 p. water, 1 p. sulphuric acid and 1 p. binoxide of manganese; the distillate contained acroleine and formic acid; carbonic acid is likewise evolved.

The mucilage of manna was obtained by repeatedly dissolving it in water and precipitating by strong alcohol; the precipitate with acetate of lead has the composition 3PbO , $\text{C}_{24}\text{H}_{16}\text{O}_{20}$; the formula of the mucilage agrees with Leuchtweiss's results, who calculated $\text{C}_6\text{H}_4\text{O}_5$. By diluted nitric acid, mucic acid was obtained which has the same composition as that analyzed by Liebig, which was obtained from gum arabic. Bouillon-Lagrange obtained the mucic acid from the mucilage of manna as early as 1819, (*Ann. de Chim. et de Phys.* iv. 10); but it is interesting that it may be obtained also from other compounds than carbohydrates.

The sugar which remains in the alcoholic mother liquids cannot readily be obtained free from mannite; but it seems to be identical with grape-sugar, for it is crystalline; its solution deviates polarized light to the right, is readily fermentable by yeast, reduces alkaline solution of copper in the cold, and turns to a yellowish-brown color, when heated with caustic soda.

J. M. M.

ON CORTEX WINTERANUS AND CANELLA ALBA.

Canella alba, Murr., growing in the West Indies, is supposed to be the origin of the Canella alba of commerce, and Wintera aromatica, Murr. s. Drymis winteri, Forst., of Patagonia, the plant yielding the commercial Winter's bark. On account of their similarity, the former has been sometimes called Cortex Winteranus spurius, and both have been frequently mistaken for one another.

Weissbecker (N. Jahrb. f. Ph. xiii. 224), has investigated the anatomy of both barks as occurring in commerce, and found, that if they are not parts of the same plant, they must be derived from very similar plants belonging to the same natural order. He likewise subjected to microscopic investigation the bark of a branch, from four to six years old, with the leaves and flowers of *Drymis winteri*, and found its structure to be entirely different from that of the commercial Winter's bark.

Professor Schenk, of Würzburg, examined the bark of a stem of *Canella alba*, Murr., and ascertained that it has no resemblance with the bark of *Drymis winteri* examined by Weissbecker. From these investigations, it is to be concluded, that the commercial *Canella alba* and *Cortex winteranus* are neither derived from *Canella alba*, Murr., or *Drymis winteri*, Forst., but that the plant yielding them is yet to be discovered. — *Wittst. V. Schr.* ix. 576, 577.

J. M. M.

THE SPONGE FISHERY OF THE OTTOMAN ARCHIPELAGO.

By P. L. SIMMONDS, F.S.S.

The principal article of export from the Ottoman Archipelago is sponge. Within the last few years the number of boats employed in the fishery has increased a third, while the number of men has nearly doubled. Average number of boats employed by each island in the sponge fishery:—

Islands.	Formerly.	In 1858.
Calymnos.....	120	254
Symi.....	120	190
Halki.....	60	65
Castel Rosso.....	40	40
Leros.....	30	30
Stampalia.....	10	12
Telos.....	—	7
Cassos.....	—	2
Total.	380	600

As there are seven men to each boat, the number of men employed now is 4200, against 2960 formerly. Of the 600 boats employed in 1858, 70 fished on the coasts of Rhodes, 150 on the coasts of Candia, 180 on the coasts of Syria, and 200 on the coasts of Barbary.

The island of Calymnos is the chief of the sponge-fishing islands in the Ottoman Archipelago. The sponge-fishing grounds are on the coasts of Candia, Syria, and Barbary. The average depth at which sponges are found is thirty fathoms; those of an inferior quality are found at lesser depths. The sponge-fishing boats in the island of Calymnos amount to 260, employing 1600 men and boys. These boats, called *scafi*, are on an average six tons each, carrying from six to seven, and sometimes eight men, of whom two are rowers.

The proceeds of the sponge are divided into shares, the divers receiving a whole share, and the rowers two-thirds of a share. The diver, who goes head-foremost into the water, takes with him a triangular-shaped stone, to which a strong line is tied to a hole in one of its corners, to assist him in his descent, and to direct him, like a rudder, to any particular spot.

On reaching the bottom, he tears off a number of sponges from the rock, gives a pull at the line, when he and the sponges in his arms are drawn up by the rowers. A good diver will make from eight to ten dives during the day.

The sponge is covered with a thin, tough, black cuticle, inside of which there is a white liquid like milk, and of the same consistence. The sponge in this state presents a very different appearance to what it does when freed from these extraneous substances. The annual value of the sponges taken by the Calymniotes amounts to about £25,000. The finest are sent to Great Britain, the common and coarser to France, Austria, and Constantinople.

There are nineteen boats, employing 120 divers, engaged in the fishery from Castel Rosso. But the sponge-fishery there is declining, as the natives find it more profitable to engage themselves as seamen in the regular trading vessels. The amount derived from sponges is calculated at about £2500 a year, the half of what it was a few years ago.

The only article of export from the island of Astropalia is sponge, to the value of about £1500 a year. There are twelve sponge-fishing boats, with 100 divers. During the months of May to September, only very old men, women and children, are to be found on the island of Symi; all the able-bodied part of the male population being at this season at the sponge-fishery.

One hundred and ninety boats are employed in it, with nearly 1500 men. The merchants of the island usually go themselves to Marseilles, or Trieste, in their own vessels, of which they now possess eighteen, of from 100 to 300 tons, to sell the sponges fished by their countrymen, to the value of about £15,000 a year, bringing back from those places various articles, part of which they send to the neighboring islands.

The sponge-fishing on the coast of Latakia is carried on during three or four months, according to the weather. A small fleet of sponge-fishing-boats, of from fifteen to twenty tons, manned each by six or ten hands, including the divers, are daily occupied in this severe but successful commercial pursuit.

Sponges exported from the port of Rhodes :—

Quality.	1856.		1857.	
	Quantity.	Value.	Quantity.	Value.
	cwts.	£	cwts.	£
Fine	302	34,872	294	51,282
Common.....	1100	25,385	1195	24,974
Coarse	333	4,487	393	479

The sponge-fishery on the coast of Rhodes, which had gradually diminished to a few boats, was actively resumed in 1858, seventy boats having gone there for the purpose, when the Governor-General immediately established a duty of twenty per cent. on all sponges taken on the coast: but, upon the divers threatening to go elsewhere, the duty was commuted for a fixed sum of £3 on each boat.

A duty of twenty per cent. is levied on all sponges taken on the coasts of Candia; but the divers are gradually leaving that island for the coasts of Barbary, where no duty is exacted, although their boats have to be carried there in vessels, and brought back in them to their respective islands, at a great expense; whereas, they could proceed to Candia in their boats themselves. It is not so much of the duty itself that these poor people complain, as of its irregular and rapacious manner of exaction.

The inhabitants of the island of Halki, who are active, hardy and enterprising, occupy themselves almost entirely in the sponge-fishery, which was doubled within the last ten years.

They send out annually sixty boats to it, manned with 450 divers. The export of sponges is calculated to reach about £8000 annually. They pay an export duty of one per cent. The Tiliotes, (island of Piskopi,) who only began a few years ago to fish for sponges, have already four boats for the purpose, with thirty divers. From the active, enterprising character of these people, there is no doubt that this branch of commerce will increase.

About 9000 okes of fine sponges are annually exported to Great Britain from the different islands. The sponges are of three qualities,—viz., fine, common and coarse. In the fine sponges there is but one in ten of the first or superior quality; the rest are of a second or inferior fine quality. In the common sponges there is one in four of a first quality; the rest are of a second common quality. In the coarse, one-half are of a first quality, and the other half of a second coarse quality. Thus it will be seen that the fine, common and coarse kinds of sponges may be divided into two qualities each. Formerly the divers used to sell their sponges by weight, to increase which they put sand in them, a practice which they still continue, though now sold by quantity.

The following are the market prices, and the value, in round numbers, of the sponges sold during five years:—

	Prices per Oke of 2½s lb.			Value of each quality sold.			
	Fine.	Common.	Coarse.	Fine.	Common.	Coarse.	Total.
	Piastres.	Piastres.	Piastres.	£	£	£	£
1854	200	40	28	30,000	20,000	4000	54,000
1855	220	40	40	33,000	22,000	5000	60,000
1856	300	60	35	35,000	25,500	4500	65,000
1857	300	65	35	51,000	25,000	5000	81,000
1858	325	100	30	35,000	50,000	5000	90,000

Of the sponges purchased in these islands, about two-thirds of the fine, one-quarter of the common, and one-quarter of the coarse (all of the first qualities), are sent to London; half of the best common quality to France (none of the other qualities are imported to that country); one eighth of the fine, and one-eighth of the common, and many of the coarse (all second quality), to Trieste. The refuse of the fine, common, and coarse

sponges are sent to Constantinople. Lately, a few good fine sponges have been sent to the United States of America.

The prices of the fine sponges were from twenty-five to thirty per cent., and those of the common thirty to thirty-five per cent. dearer in 1858 than in former years. This increase was owing to the competition of the many European sponge merchants, who had come there latterly, in person, to make their purchases. 2745 cases and sacks of sponge, valued at 4,105,600 piastres, were shipped from Smyrna in 1857.

The fisheries of the Gulf of Volo (Thessaly) form a source of local wealth. Sponges of the best quality are annually taken to the value of £2000.

The following figures from the official returns show the total quantities and value of Turkey sponge imported during six years. It is received principally through the four channels of France, Greece, Turkey Proper, and Austrian Italy, and sometimes from Malta and Egypt. We shall take another opportunity to speak of the more common Bahamas and American sponge. It may be added that the average computed or official value is no fair criterion of price. There has, however, been a steady advance in price of late years. In 1854 the computed or official value was 6s. 3d. per pound; in 1858, 11s. 3d.; but the selling price of the best is 21s. per pound.

Imports of sponge into the United Kingdom:—

	Quantity lbs.	Value £
1853	205,924	
1854	224,787	70,246
1855	329,985	140,164
1856	313,287	172,308
1857	318,676	164,650
1858	287,681	157,751

London Pharm. Journ. Dec. 1860, from the Technologist.

A NEW FILTER.

Professor Malapert, of Poitiers, places in the midst of his filters, in the pulp of the paper, a disc of cloth which increases its solidity. The operation of filtering is slower but more sure. The new filter is approved by the Society of Pharmacy of Paris, and is considered to fulfil all the conditions required for delicate chemical experiments. It contains no lime or iron, and only a trace of chlorine.—*London Pharm. Jour. Dec. 1, 1860.*

ON THE INTRODUCTION OF THE CINCHONA TREES INTO INDIA.

For some years past, great anxiety has been experienced in this country and other parts of Europe, in consequence of the enormous demand for Cinchona barks, and the increasing difficulty of supplying that demand. It was feared, from the little consideration shown by the natives of the bark districts of Peru and Bolivia in felling the trees without taking any measures to plant others to supply the place of those thus destroyed by them, that a time must arrive, and that at no very distant period, when the supply of Cinchona bark would altogether fail. Hence, it became very desirable that the European Governments possessing colonies with climates adapted for the growth of the Cinchonas, should endeavor to obtain supplies of seeds and plants of the best species, and establish them in their own possessions.

Some years since, Dr. Weddell, a most experienced botanist and enterprising traveller, proceeded to the Cinchona districts, and succeeded, by means of great energy and hardihood, in elucidating much that had been hitherto obscure as to the botanical origin of many of the barks in common use in Europe. At the same time he succeeded in obtaining some seeds, which he brought to Paris in 1848. From these seeds plants were afterwards raised, both in Paris and at the Horticultural Society's garden at Chiswick, but no attempt, to any extent at least, was made by Dr. Weddell or the French Government to acclimatize the Cinchonas in any part of the French possessions.

A few years after Dr. Weddell's return to Europe, the attention of the Dutch government was directed to this important subject, and M. Pahud, the governor of the Dutch East Indies, sent a very intelligent gardener, M. Hasskarl, to Peru and Bolivia, for the express purpose of obtaining a supply of plants and seeds of the Cinchonas, for transportation to the Island of Java, where it is believed that a favorable soil and climate might be found for their successful growth. After a residence of two years and a half in Peru, M. Hasskarl succeeded (through the agency, it is said, of one Henriquez, who was imprisoned in Bolivia for having supplied him) in procuring about 400 plants

of Cinchona Calisaya in a flourishing condition. These were forwarded from the port of Islay to Java, where they arrived safely in 1853, and were at once planted in the mountainous districts near Bandong in that island. By referring to a note "Cultivation of the Cinchona Trees in Java" in the present number of this Journal, it will be seen that the plants have now become firmly established there, and already begin to yield bark of good quality. (See page 47.) This expedition of Hasskarl's, therefore, must be regarded as having been eminently successful in every respect, and to the Dutch Government accordingly belongs the merit of having been the first to succeed, on a large scale, in acclimatizing the Cinchonas.

The successful expeditions of the French and Dutch would appear to have forced the attention of the English East India Company to the importance of obtaining plants and seeds of the best species of Cinchona for transportation to India, where such could, without doubt, be readily acclimatized over extensive areas. Dr. Royle's death, and the uncertainty attending even the existence of the Company, appear to have been the principal reasons why an expedition for such a purpose was not at once despatched from this country. Ultimately, however, in 1859, Mr. Clements R. Markham, one of the clerks in the India office, was appointed to direct such an expedition, and that gentleman also procured the services of Mr. Wier, a gardener, to assist him in his labors.

In noticing Mr. Markham's appointment to our readers in the *Pharmaceutical Journal* last year, we stated that he had been selected for that office principally on account of his knowledge of the country to be visited, and of his acquaintance with the Spanish and the language of the Indians inhabiting it. Mr. Markham was also admitted to be a gentleman possessing much courage and energy of character. With such qualifications, if combined, we said, with a competent knowledge of botany, he could scarcely fail in being successful in his endeavors. Mr. Markham, however, made no claim to be considered as a botanist or scientific man, and considering the importance of such a knowledge in the expedition in which he was about to be engaged, it certainly did strike us as somewhat remarkable that he should have been selected by the English Government as the

most suitable man to take the command of such an undertaking. We do not, however, blame Mr. Markham in this matter, the responsibility of such an appointment rests entirely with the Government who commissioned him. Moreover, after his appointment, Mr. Markham applied himself for some months before starting to qualify himself botanically for the work in which he was about to be engaged. With a knowledge of all these facts before us, we had great hopes that the expedition would prove in some degree at least successful, notwithstanding the admitted deficiency of Mr. Markham's botanical knowledge and skill, and in this we have not been disappointed, as will presently appear.

After a time, Mr. Markham, accompanied by Mr. Weir, proceeded on his journey, and returned from thence in June last, when he reported its result to the India Board. The following notice of this report, and extracts therefrom, are derived from the *Gardeners' Chronicle* of August 11th, and will supply our readers with a short summary of the route taken by Messrs. Markham and Weir, and of some of the difficulties and dangers they had to contend with:—

On the 12th of March of the present year Mr. Markham left Arequipa, a town in Southern Peru, with Mr. Weir, a gardener, and travelling inland arrived at the city of Puno, on the banks of Lake Titicaca, on the 27th, a very painful journey, over snowy heights 15,500 feet above the level of the sea, in the worst season of the year, the rigors, of which were increased by the debility brought on by an illness from which he had suffered at Arequipa, and by the *sorocho*, or violent headaches and sickness, occasioned by the great elevation of this region above the sea. The loftiest part of the road is several hundred feet above Mont Blanc. This route was taken with a view to entering from the north the republic of Bolivia, the head-quarters of that sort of Cinchona called Calisaya; a project which was prevented by weather and the unsettled state of the country. Moreover, he heard that the government and people were so jealous of preserving a monopoly of the bark trade as to render it impossible for him to make a collection personally. These obstacles, be it observed, were no hindrance to either Weddell or Hasskarl. Foiled in his attempt to get into Bolivia, Mr. Markham struck across the country to a place called Sandia, on the eastern slope of the

Cordillera, within the Peruvian frontier, which seems to have been his temporary head-quarters. Of the *agrémens* of his journey we have such accounts as the following:

“On the road from Puno to Carabaya there were four broad and very rapid rivers to cross on *balsas*, or long bundles of reed stitched together, while the mules swam. The plains and mountain ranges over which the way passed averaged a height of 12,000 to 13,000 feet above the level of the sea, and one snowy pass attained a height of nearly 17,000 feet. The season was one of violent storms, with hail and snow and constant rains.

“Beyond the river Challuma, a tributary of the Tambopata, and the extreme point reached by Dr. Weddell, there is no path of any kind, the trees are of great height, and the ground is entirely choked up with creepers, fallen masses of trees and bushes, and tangled bamboos. In many places, the way led along the verge of a precipice overhanging the river, which boiled and surged many hundreds of feet below. Our encampments were made each night on any stony beach we could find where there was space to light a fire and pitch the tent, and all day we toiled and struggled through the closely-woven jungle.

“On the 4th, I made a toilsome and dangerous forest journey, along the most giddy precipices, overhanging the river, with no foothold but decaying leaves, nothing to grasp but rotten branches, every motion a drenching bath from the wet branches, every other step a painful and dangerous slip or fall.

“Since leaving Sandia on April 24th up to May 15th we had walked over 174 miles, which may not, at first sight, appear very much; but when it is considered that it was chiefly not walking, but scrambling on hands and knees up precipices or through dense forests, and that there was not one day given up to rest, while the supply of food was exceedingly small and precarious, I think it will be considered tolerably good work.

“On the 17th of May, I left Sandia, with one Indian and two mules carrying the plants, and halted under a splendid range of frowning black cliffs, near the summit of the snowy Carabaya range. On the 18th I reached the summit of the range, and commenced the journey over vast grass-covered plains covered with stiff white frost. After being 11 hours in the saddle, I stopped at an abandoned shepherd's hut built of loose

stones. The plants, well covered with the tent and blankets, were placed by my side during the night with the thermometer between us, which, at 6 A. M., was at 20° . The days and nights bitterly cold, but very fine, and generally cloudless. On the 19th I was 10 hours in the saddle, and passed the night again in an abandoned hut with the plants beside me, where the minimum of the thermometer was 30° . Two more journeys of similar length, when the minimum during the night of the 21st was 21° , and of the 22d, 16° , brought me to Vilque, where I procured an arriero and mules to convey me to Arequipa. The sufferings during my six days' journey over the lofty plains from Sandia to Vilque were very great. The cold was intense, the work I had with the vicious, unmanageable mules was a constant source of anxiety, and I had no food whatever beyond a little parched maize. Every day I was upwards of 10 hours in the saddle."

It will be seen by the above extracts from Mr. Markham's report, that he had to contend with great difficulties and dangers in his journey, and that he surmounted them with much energy and courage. Every one must admit the truth of this. Ultimately, he succeeded in obtaining, and conveying to Islay, 529 plants of Cinchonas, chiefly, he states, of that species called Calisaya. Of these plants, however, 73 perished by cold, or were broken, or otherwise injured in their passage across the region of the Andes; and when we consider the intense cold of that region, the extent of country through which the plants were conveyed (upwards of 300 miles,) and the otherwise difficult nature of the district traversed, this must be regarded as a very fair result. The remaining 456 plants were forwarded in Wardian cases to this country. These cases reached Southampton in safety, and it is stated that 216 plants had, on their arrival, already begun to throw out shoots, while over 60 more were still alive. The remaining 180 plants we suppose perished on their way from Islay to Southampton; and when we inform our readers that the cases of plants, instead of being carried directly from Islay by a steamer to India, which would have been by far the best mode of transit, were taken first to Panama, and then across the Isthmus, and then by way of the West Indies to England, we can only express our surprise that so many plants survived the

dangers of the journey and the vicissitudes of climate, &c., to which they were exposed by such an indirect route.

The plants are now on their way to India, where, should they arrive in a suitable condition, they will, we believe, be planted in the Neilgherry Hills, as this district is considered to be a very favorable one for the growth of the Cinchonas. Mr. Markham has also proceeded to India for the purpose of superintending the plants in their transit, and subsequent establishment. He proposes to return to this country next spring, to which period he has deferred the publication of his observations upon the Cinchona regions which he traversed, and all other particulars respecting the expedition in which he has been engaged.

No seeds were obtained by Mr. Markham in the late expedition, as the season for collecting them had not arrived when he was in the bark country. Before leaving South America, however, he commissioned a Mr. Pritchett to look out for seeds for him in the more northern bark districts, and forward such to him; these he hoped would reach him by the present month.

Such being the result of Mr. Markham's expedition, upon a full and impartial consideration of it in all its bearings, we cannot agree in the opinion which has been expressed in some quarters—that it has proved almost a failure, that is, taking for granted that the plants obtained are chiefly those of the true *Calisaya*, which Mr. Markham states to be the case, and of the correctness of which we have no means of judging, and have no right, therefore, to call in question.

Some errors of judgment were, no doubt, committed in the late expedition; thus, we believe (and in this belief we know that we are supported by some eminent authorities), that it would have been better if Mr. Markham, instead of endeavoring at the commencement of his journey to penetrate into Bolivia, the bark districts of which are jealously guarded by the Government, had at first explored other more accessible regions farther north, and then, after having succeeded in obtaining supplies of plants or seeds, or both, from such regions, and forwarded them to a safe spot, or at once home, he could have attempted to make his way into Bolivia to the head-quarters of the *Calisayan* district. By such a course of proceeding, Mr. Markham, would, we think, have saved himself much unnecessary fatigue and danger, and

would have succeeded more completely in his expedition. Should Mr. Markham, however, have taken his late route in the direction he pursued by the advice of Dr. Weddell, which we have heard was the case, it must be admitted that he could not have gone to higher quarters for advice, and acting on such suggestions, no blame can attach to him.

The greatest mistake of the expedition, however, was undoubtedly that of the English Government, and for which Mr. Markham was not responsible. This was, in not directly chartering a steamer from Islay across the Pacific to India for the conveyance of the plants collected, instead of forwarding them at first to Panama, thence across the Isthmus, and then by way of the West Indies to Southampton, then, after allowing them to remain there for some time, to ship them to Egypt, to be from thence conveyed across the burning regions of the Desert and the Red Sea, &c., to one of the ports on the western shores of India. Whatever success might have attended Mr. Markham's labors, such could not but be seriously imperilled by adopting such an indirect and dangerous route for the transportation of the plants.

We trust, however, that notwithstanding all the difficulties and dangers to which the Cinchona plants have been, and will be, exposed, that Mr. Markham may ultimately be rewarded for his exertions, and the trials which he has undergone; and that in a few years we shall find the Cinchonas thoroughly established over several extensive regions in India, so that we need no longer have to look forward with any apprehension to the day when our supplies of Cinchona bark from South America must cease. We wish every success to Mr. Markham in his present journey to India, and shall be glad to have a favorable report of his final exertions upon his return to England.—*London Pharmaceutical Journal*, 1860.

ON THE PREPARATION OF ARTIFICIAL COLORING MATTERS WITH THE PRODUCTS EXTRACTED FROM COAL TAR.

By M. E. KOPP.*

The dry distillation of organic matters, whether vegetable or animal, from the great variety of products to which it gives rise,

* Abridged from the *Moniteur Scientifique*. t. ii, liv. 86.

constitutes one of the most interesting operations of chemistry. The reactions to which these products owe their origin are very complex, and some of them have been but little studied, as indeed is the case with many of the substances formed. If the body submitted to dry distillation could be maintained during the operation under uniform conditions of desiccation, temperature and pressure, the reactions and the products would be much more simple. If, for example, wood be heated very slowly in close vessels, first to 100° C. then to 200° , 300° , and so on, there is at first disengaged almost pure water, then impure strong acetic acid, and afterwards a mixture of acetone and acetate of methylene; the maximum of charcoal is left as residue, and the least amount of tar and gas is produced, the latter consisting only of carbonic acid and carburetted hydrogen.

In practice, however, when wood is distilled in cylinders of iron heated from the outside, the heat only penetrates to the interior gradually. The outside layers are therefore the first decomposed; they at first lose water, then furnish pyroligneous acid and wood-spirit, at the same time giving off carbonic acid and a little carburetted hydrogen. The inner layers in turn are similarly decomposed; but the products as they are given off are brought into contact with the outer layer, already in a more advanced state of decomposition and at a much higher temperature, and hence new reactions take place and new products are formed. Thus, the vapor of water in contact with red hot charcoal is decomposed, and forms carbonic acid and hydrogen; a part of the carbonic acid is again decomposed by the red-hot carbon to form some carbonic oxide; a part of the nascent hydrogen combines with carbon to form various hydrocarbons; one part of the acetic acid is decomposed by the high temperature to form acetone and carbonic acid; another part reacts on the wood-spirit and forms methylic acetate; a fraction of the wood-spirit and acetone are also decomposed, producing tarry matters, pyroxanthrine, oxyphemic acid, dumasine, &c. To these must be added the influence of certain nitrogenised bodies, and we can understand how all these compounds, successively formed under the most favorable circumstances for acting on one another, since they are in the nascent state, and exposed to a high temperature, may give rise to the formation of a great

variety of very different compounds which will be set free either in the state of a permanent gas, or a condensible vapor, and leave fixed carbon as a residue. The same takes place whether wood, coal, bituminous schists, Boghead coal, asphalt, peat, resin, oils or animal matters be distilled; but it is evident that the original composition of the material submitted to dry distillation must powerfully influence the nature and composition of the products. In those which like wood are rich in oxygen and poor in nitrogen, the pyrogenous products contain much acetic acid and but little ammonia, and consequently have an acid reaction; on the contrary the matters containing much nitrogen, and but little oxygen, like coal and animal matters, give rise to the formation of much ammonia, and the products have an alkaline reaction.

We intend in this article to confine our attention to the products obtained by the distillation and rectification of the coal tar from gas works. Considerable differences are noticed in the composition of the tar procured from different qualities of coal and schists, according to the rapidity with which the distillation has been conducted. Some tars, for instance, contain but little benzole and much naphthaline; Boghead tar is rich in paraffine; others contain a preponderating quantity of phenol and benzole.

Table of the Products obtained by the Distillation and Rectification of Coal Tar.
Liquid Products.

Solid Products.	Liquid Products.			Gaseous Products.
	Acids.	Neutral.	Bases.	
Carbon.	Rosolic.	Water.	Ammonia.	Hydrogen.
Naphthaline.	Brunolic.	Essence of tar.	Methylamine.	Carburetted
Paranaphthaline, or	Phenic, or	Light oil of tar.	Ethylamine.	hydrogen.
Anthracene.	Phenol.	Heavy oil of tar.	Aniline.	Bicaruretted
Paraffine.	Acetic.	Benzole.	Quinoline.	hydrogen.
Chrysene.	Butyric.	Toluole.	Picoline.	Various hydrocarbides.
Pyrene.		Cumole.	Toluidine.	Carbonic
		Cymole.	Lutidine.	oxide.
		Propyle.	Cumidine.	Sulphide of
		Butyle.	Pyrrhol.	carbon.
		Amyle.	Pætinine.	Carbonic acid.
		Caproyle.		Hydrosulphuric acid.
		Hexylene.		Hydrocyanic
		Heptylene.		acid.

Whatever may be the composition of the different kinds of tar,

they are all submitted to distillation in order to isolate the principles capable of industrial application. But first of all it is necessary to separate the tar, as far as possible, from the ammoniacal liquor which is found with it. For this purpose it is heated for some hours to 80° or 100° C., by which it is rendered more liquid, and then the water separates more easily. It is then allowed to cool very slowly, and the water is drawn off by a tap placed at the lower part of the boiler. A certain quantity of tar obstinately retains the water, constituting a buttery matter, which may be allowed to run away with the water, to be added afterwards to another quantity of tar, to be dehydrated by a fresh operation.

Experience seems to have demonstrated that the most simple process, that is to say, distillation over a naked fire at the ordinary pressure, is still the most practicable and advantageous. As the volatile products have but little latent heat, the height of the still should be somewhat less than the diameter; for the same reason the head must be carefully protected from cold, and it is well to furnish the inside with a circular gutter, in which the products condensed in the head may be collected and run into the refrigerator. By this means the products are prevented from flowing back into the boiling tar and being decomposed by coming in contact with the sides of the still, which, especially towards the end of the operation, become very hot.

In condensing the vapors it is necessary to observe certain precautions. At the beginning of the operation, when the lighter and more volatile oils are passing, the worm must be well cooled to make quite sure of the condensation. Later, when the heavier and less volatile products are coming over, the water in the refrigerator may be allowed to get heated to 30° or 40° , and at last when the matters capable of solidifying, such as naphthaline and paraffine, pass, the temperature of the refrigerator should never be under 40° , and it may be allowed without inconvenience to rise to 60° or 70° . At this temperature the products condense perfectly, but remain liquid and run with ease. If the refrigerator were kept quite cold during the whole process, it might happen towards the end that the condensing tube would become blocked up by the solidified products, and a dangerous explosion might ensue.

At the beginning of the distillation the tar should not be allowed to boil too fast. Some distillers at this period pass a current of steam at 110° or 120° through the tar, to assist the disengagement of the more volatile oils. These in condensing form a limpid very fluid liquid, having the density .780, which gradually rises to .850; the mean density of all the products united is about .830. It is this which constitutes the benzine of commerce. It contains a great variety of compounds whose boiling points range from 60° to 200° . They belong principally to the following series:— C_nH_n *e. g.* Amylene C_5H_8 ; Hexylene (Oleene, Caproylene), C_6H_8 ; Heptylene (Oenenthy-
lene), C_7H_{10} , &c. C_nH_{n+3} *e. g.* Propyle C_3H_8 ; Butyle C_4H_{10} ; Amyle C_5H_{12} , &c. C_nH_{n-6} *e. g.* Benzene, C_6H_6 , &c.

When the density of the products exceeds .850, the current of steam is stopped and the heat is increased. As soon as the temperature of the tar has risen to 200° — 220° , the distillation recommences, and the oil condensed is found to have the sp. gr. .860—.900, the mean being from .880 to .885. This product constitutes the heavy oil of tar, and contains phenol, creosote, and aniline.

Lastly, the ultimate products of the distillation, which on cooling become a buttery mass (or crystalline, if they contain much naphthalene), are set aside for the preparation of paraffine. They are placed in vats, which are cooled, in order that the solid matters may separate by crystallisation.

According to Payen, 2000 parts of rough oil or tar obtained by the distillation of Boghead coal furnish on rectification:—

1208 parts light oil, density=	.825
200 “ heavy oil, “	=.860
400 “ pitch.	

The loss of 200 parts represents the gases, and the vapors and oils which have escaped. 2900 parts of tar from gas works using Boghead coal, distilled in a similar manner, yielded:—

Water, slightly ammoniacal . . .	168 parts.
Light hydrocarbons, mean density .	.820 480 “
Heavy hydrocarbons “ .	.863 883 “
Fatty pitch, solid when cold, liquid at 150°	1195 “
Loss 6 per cent.	174 “

Before rectification, the oils are agitated for an hour with concentrated sulphuric acid, the light with 5 and the heavy with 10 per cent. They are then allowed to rest for 24 or 36 hours for the acid and impurities to deposit. The oil is then separated and washed once or twice with water and afterwards with a solution of caustic soda sp. gr. 1.382. For the lighter, 2 per cent. of the soda solution will be enough, but the heavier will require 6 per cent. When so purified the light oil is rectified by distillation with a current of steam. The condensed product having a mean density of .815 to .820, is the benzole of commerce.

The heavy oil is distilled without the assistance of a current of steam. The condensed product has a mean density of .860, is of a clear yellowish color similar to that of Madeira wine, and has the disagreeable odor of sulphur compounds, formed by the action of the sulphuric acid. This may be destroyed by shaking the oil before distillation with a solution of sulphate of iron, or after distillation with the addition of some caustic soda to the sulphate of iron. A blackish deposit of sulphide of iron is formed and the oil loses its bad odor.

Paraffine and the heavier mineral oils which drain from the paraffine are purified in the same way by means of sulphuric acid, which is sometimes combined with oxidising agents, such as bichromate of potash, peroxide of manganese and manganate of potash, &c., and subsequently washing with caustic soda. After the action of the acid and alkali, paraffine is sometimes rectified by a second distillation, but more frequently the purification is completed by a second treatment with sulphuric acid followed by a careful washing, after which the paraffine is mixed with 1 per cent. of stearic acid and treated with the caustic soda. The alkali by saponifying the stearic acid forms soapy flocculi which envelope the impurities, and the melted paraffine is rendered perfectly limpid.

The acid and alkaline residues of the above purifying processes are generally thrown away, but in them are found the principles which may be utilised for the production of the coloring matters. The sulphuric acid, for example, must combine with all the alkaline compounds such as aniline, quinoline, toluidine, cumidine, &c.; while the caustic soda must unite with

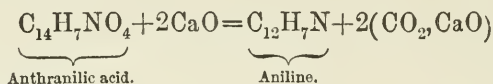
the acid principles like phenol, creosote and rosolic acid. Vohl* has already proposed to extract phenol and creosote from the alkaline solution by supersaturating it with the acid solution, decanting the oily layer which separates, and rectifying it over a naked fire. A more rational process, according to the author, would be the following:—Collect all the acid and alkaline liquors, and determine how much of the acid liquor would be sufficient to saturate a given volume of the alkaline. This being known, mix the alkaline solution with twice the quantity of acid liquor necessary to saturate it. If the two be mixed rapidly, sufficient heat will be developed to raise the mixture almost to the boiling-point, and a concentrated solution of bisulphate of soda will be formed which retains in solution the bisulphates of aniline and toluidine, while the phenol and creosote easily separate in form of a brown oil. This oil may be separated while the mixture is still warm, and rectified. A light neutral oil first passes, and afterwards the phenol and creosote distil almost pure.

The solution containing the acid sulphates of soda and the organic bases, yields on cooling, crystals of bisulphate of soda, which may be collected on a filter. The acid liquor not used to saturate the soda solution may then be added from the mother-liquor from the crystals, and the whole heated to 60° or 80° C. Chalk or milk of lime is then added to partial saturation, the sulphate of lime is allowed to deposit, and the liquor is concentrated. Finally the concentrated acid sulphates are introduced into an iron still, and an excess of quick lime is added. Sulphate of lime and some sulphate of soda are formed, the organic bases are set at liberty, and on heating they pass over and condense with some water. If the quantity of water be sufficient to hold the bases in solution, the distilled aqueous solution must be saturated with hydrochloric acid and evaporated, first over a naked fire and then over a water bath, almost to dryness. The residue placed in a retort is mixed with an excess of quick lime and distilled, when an oily liquid is obtained which consists principally of aniline, toluidine and quinoline, sufficiently pure for the preparation of the coloring matters. We shall now

*Journal für Prakt. Chem. Bd. lxx. s. 296.

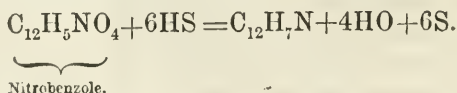
notice successively the compounds from which the coloring matters may be formed, and the coloring matters themselves, describing the most advantageous and best known processes for obtaining them.

1. *Aniline*.—Unverdorben first discovered aniline among the products of the dry distillation of indigo, in 1826. As it formed crystallised salts with acids he gave it the name of *crystalline*. In 1840 Fritsche made anthranilic acid by introducing finely powdered indigo into a hot and strongly concentrated solution of caustic potash. One of the most remarkable properties of this acid is its splitting up into carbonic acid and aniline when distilled with quick lime.

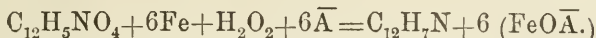


Erdmann first observed that aniline was identical with the crystalline of Unverdorben. Hoffman afterwards showed that to prepare aniline it was not necessary to make anthranilic acid, but that it sufficed to distil indigo directly with hydrated caustic potash, the aniline being formed in consequence of a real oxidation of the indigo.

Isatine a product of the oxidation of indigo by weak nitric acid also furnishes aniline on distillation with caustic potash. Runge, 1837, first announced the existence of three volatile bases in coal tar, which he named respectively kyanol, leukol and pyrrhol. Hoffmann subsequently demonstrated that kyanol, was identical with aniline, and later he proved that leukol was identical with quinoline, a base which Gerhardt had obtained by distilling the cinchona alkaloids with mineral alkalies. Another very remarkable method of forming aniline is based upon the action of reducing bodies on nitrobenzole. Zinin, by saturating an alcoholic solution of nitrobenzole with ammonia, and then passing sulphuretted hydrogen as long as any deposit of sulphur was formed, obtained an organic alkali which he called benzidam, but which was afterwards proved to be aniline.



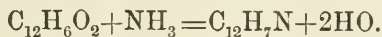
Bechamp showed that the reduction could be effected equally well by means of ferrous acetate or acetic acid and iron.



Before this, however, Hoffmann had shown that nitrobenzole might be converted into aniline by the action of zinc and hydrochloric acid.

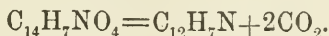
Lastly, Wöhler has discovered that nitrobenzole may be reduced and transformed into aniline by digestion and distillation with a solution of arsenious acid in an excess of caustic soda.

Amongst other methods of producing aniline we quote the following. Phenol and ammonia placed in a stout tube sealed and exposed for a long time to a high temperature form aniline.



⏟
Phenol.

According to Hoffmann and Muspratt nitrotoluene and salicyalimide, two bodies isomeric with anthranilic acid, furnish aniline when heated to redness.



⏟
Nitrotoluene.

Of all the methods, however, two only appear to serve as industrial processes :

1. Extraction from coal tar.
2. Reduction of nitrobenzole.

Chem. News, London Sept. 1, 1860.

(To be continued.)

CULTIVATION OF THE CINCHONA TREES IN JAVA.

At a recent meeting of the Society of Pharmacy of Paris, M. Schaeffele communicated the following information on this important subject, derived from a private letter of M. de Vry, Chemical inspector at Bangdong, Java :—

“ The cultivation of the Cinchona tree in the island of Java is in full prosperity. The young trees already exceed the height of five metres (nearly sixteen and a half feet); they have produced thousands of fruit, the seeds of which have for the

most part germinated, and thrown out a considerable number of shoots.

“Dr. de Vry is about to publish a first memoir on this subject, of which the text, in German, will shortly appear in the *Bonplandia*. This work comprises the cultivation and chemical composition of the *Cinchona*. He has already forwarded to his Government some sulphate of quinine, quinoidine, and pure cinchonine. He has now obtained four per cent. of alkaloïds, which promises well for the future.

“This chemist is about to undertake a work which will have for its object the determining the relative richness of the barks, according to the different altitudes under which the *Cinchona* trees grow and develop.

“When we recollect the isolation of the *Cinchona* trees in the forests of South America, and the difficulties to be overcome in the discovery of others, often at great distances; when we know with how little consideration the natives fell the *Cinchona* trees, and when we contemplate the scarcity that must arise at some time or other; we cannot too much applaud the persevering efforts and great sacrifices of the Dutch Government. In short, everything promises, that in the course of time the cultivation of the *Cinchona* in the mountains of Bandong will supply our generation with regular and inexhaustible supplies.”

In consequence of this note of M. de Vry, M. Reveil observed, that at the last meeting of the Imperial Society of Acclimatization, a prize of 1500 francs had been proposed for a successful attempt to acclimatize the *Cinchonas* in France or in the mountains of Southern Europe. This prize will be awarded in 1861. —*London Pharm. Journ. from Journal de Pharmacie et de Chimie.*

NOTE ON PERSIAN OPIUM.

BY DR. O. REVEIL.*

Persian opium, which for many years has been but seldom met with in commerce, is now becoming more abundant; it is important therefore to decide on its value as a medicine, and the place

*Slightly abridged from *Journ. de Pharm. et de Chim.* Aug. 1860.

which it ought to occupy in therapeutics, as well as the uses which may be made of it in pharmacy.

Persian opium is imported in the form of thin cylindrical sticks four or five inches long, which sometimes become flattened by pressure one against the other. Each stick is wrapped in white or rose-colored paper, and tied with cotton. The weight of each stick is about fifteen grammes. Guibourt has remarked that the paste, although apparently homogeneous, is seen when cut into to be made up of small lumps agglutinated together, the lumps being much smaller than those seen in Smyrna opium. It is of a reddish-brown or liver color, has a strong smell, a very bitter taste, is slightly hygrometric, and is very soluble both in water and alcohol. One sample (in sticks), analysed by the author, yielded the following results:—

Matters soluble in water	.	.	82.60 per cent.
“ “ alcohol	.	.	81.60 “
Alkaloids 12.30 { morphia	.	.	8.15 “
{ narcotine	.	.	4.15 “

The aqueous solution of this opium treated with anhydrous alcohol gave a flocculent precipitate. When treated with the tartrate of potash and copper the cupric salt was reduced, proving the presence of sugar, a fact which was confirmed by the fermentation test. Estimated by a standard cupro-potassic solution, it was found that the sample contained 15 per cent. of glucose. The author has never detected sugar in Constantinople opium, but has sometimes discovered notable quantities in that imported from Smyrna. The presence of this body appears to him an indication of falsification, for he has never found any in the opium made in France.

Another sample of Persian opium received by the author presented quite a different form. It was in the shape of flattened ovoid lumps without envelope either of paper or poppy leaves, nor did it contain any seeds of the rumex such as is seen in Smyrna opium.† The physical characters, apart from the form, closely resembled those of the preceding. It was somewhat

†We have received Persian opium in this form from Mr. Maltass of Smyrna, who informs us that the opium is never imported in this state. The cylindrical sticks are made into lumps of this shape in France.—Ed. CHEM. NEWS.

softer, however, and perhaps more hygrometric. It mixed easily with water and alcohol. The solution blackened with potash, and it reduced the cupro-potassic tartrate. In this sample the author found 31.6 per cent. of glucose. The results of an analysis were as follows:—

Matters soluble in water	.	.	84.20 per cent.
“ “ alcohol	.	.	80.60 “
Alkaloids 12.0 {	morphia	.	6.4 “
	narcotine	.	5.6 “

In another specimen the author found 13.9 per cent. of sugar. When ammonia was added to a solution of this opium a very abundant yellowish white gelatinous precipitate was obtained; absolute alcohol also gave a floccular precipitate. Ordinary alcohol almost entirely dissolved this sample, giving a thick viscous liquid, which when pressed through a cloth left but a small residue: on filtration through paper a more abundant residue was obtained. The results of the analysis of this specimen were as follows:—

Matters soluble in cold water	.	.	76.5 per cent.
“ “ alcohol	.	.	93.7 “
Alkaloids 16.15 {	morphia	.	7.1 “
	narcotine	.	9.05. “

Another sample differed essentially from the foregoing. It was also in flattened lumps, but enveloped in a leaf which the author could not identify. He also remarked some fruits of a rumex in it. In color and smell it resembled the others; but it mixed less easily with alcohol and water. The solution blackened with potash, and the cupro-potassic test showed the presence of 31.6 per cent. of sugar. Analysed like the preceding the following results were obtained:—

Matter soluble in water	.	.	79.20 per cent.
“ “ alcohol	.	.	75.60 “
Alkaloids 15.0 {	morphia	.	5.10 “
	narcotine	.	9.90 “

All these opiums appear to the author very remarkable for their very great purity, or rather for the almost complete absence of foreign matters insoluble in alcohol and water. But their light color, and the relatively very large proportion of narcotine

and glucose which they contain incline him to assert that they are not natural products, but opium, to which some narcotine and the pulp of apricots have been added. He sees no objection to the use of Persian opium when opium is prescribed alone, but believes it ought not to be substituted in the preparation of extract and tincture, because of the smallness of the residue left. On this account an extract prepared with Persian opium will be less rich in alkaloids than one made from Smyrna or Constantinople opium, even though these latter may only contain 6 per cent. of alkaloids.

In a report presented to the Academy of Medicine of Brussels, M. Victor Pasquier makes the following observations:—

“It is to be remarked that we should greatly err if we laid it down as a general and absolute principle that an opium richer in morphia than another ought always to be preferred to the latter for all pharmaceutical preparations of which it may form the base; it may be, on the contrary, not only that an opium less rich in morphia ought to deserve the preference, but that one more strongly charged with the alkaloid would not even serve the same purpose.”

This passage is made clearer by the following note, which is quoted from the *Journal de Pharmacie d'Anvers*, April, 1860. Suppose, for example:—

An opium A containing morphia	.	.	4.50 per cent.
“ B “	.	.	3.73 “
The opium A gives an ext. containing morphia	6.32	“	
“ B “ “	8.29	“	
“ A gives extract weighing	. 68.00	“	
“ B “ “	. 45.00	“	

From which it appears that in selecting an opium for some pharmaceutical preparations it is necessary to take into account not only the proportion of morphia contained in opium, but also the solubility of the various principles of opium in the different menstrua with which we act on it.

In the estimation of morphia, the author recommends the use of chloroform to separate the narcotine, and then cautions the experimenter against reckoning as morphia all that is soluble in alcohol after the separation of the morphia. Without this precaution, he adds that one is apt to estimate as morphia what is

merely phosphate of lime, or ammoniaco-magnesian phosphate when the precipitate has been effected by ammonia.

There is no doubt that at the present time opium is manufactured of opium residues, to which various extractive substances and some narcotine is added. Some specimens examined by the author, which presented none of the characters of good opium of commerce, contained 7.6 per cent. of alkaloids, composed of 2.1 morphia and 5.5 narcotine.—*Chem. News, London, Sept. 1, 1860.*

PRODUCTION OF OPIUM IN FRANCE.

As the cultivation of the Opium Poppy for the purpose of obtaining opium, and for its seeds, is now exciting much attention in France, we subjoin a summary, from the *Journal de Chimie Médicale*, of the more important conclusions which have been arrived at by our neighbors upon this subject. Although the amount of morphia stated to have been obtained, in some cases, from the opium, is, no doubt, over estimated, still the experiments which have been for the last few years carried on in France, show satisfactorily that opium of excellent quality may be commonly obtained from plants there cultivated:—

“M. Bénard, Professor in the School of Medicine at Amiens, and M. Collas, Pharmacien of Paris, have continued the researches they commenced in 1855, on the production of indigenous opium. Their experiments were made in the department of La Somme, where the cultivation of the poppy is pursued over a large area. The information there gained may serve as a guide to the pharmacien in the very numerous localities where the poppy is now cultivated. They prove beyond doubt that the production of the seed, and of opium, may be carried on together without the one injuring the other.

“It is not necessary to enter into details upon the cultivation of the poppy. We note only, that it is found most advisable, both to facilitate the keeping of the ground in order, as well as for the collection of the opium, that the seed should be sown in rows, at intervals of from twenty to thirty centimetres (from about eight inches to nearly a foot).

“In the department of La Somme alone, 12,702 hectares

(about 31,388 acres) were set apart in 1857 for the cultivation of the poppy; and 140,000 hectolitres (about 385,168 bushels) of seed were collected. The total value of this seed was 4,480,000 francs, which gives an average of 352 francs (about £14 1s. 6d. per hectare), that is, about £5 13s. 6d. per acre.

“The value of the opium crop is on the increase. The expenses of extraction vary from 20 to 30 francs per kilogramme for dry and marketable opium. The price of sale varies from 70 to 75 francs, at a standard of 10 per cent. of morphia.* Two kilogrammes (nearly 4½ lbs. avoird.) of the milky juice containing opium yield about one kilogramme of dry opium: two to three kilogrammes are obtained from one hectare. The value of the opium produced on an average per hectare, would be 150 francs (£6), that is, about £2 8s. per acre. This, in the department of La Somme alone, would leave the cultivators 1,905,000 francs. This value would be in addition to that of the seed. If this speculation were carried on in all the departments where the poppy is cultivated, it would produce a considerable sum, and would meet the requirements of French Pharmacy.

“The mode of extracting the juice is substantially the same as that pursued in the East, and its sale is easy.†

“Upon the whole, it has been now established:—

“1st. That the time for experiments has passed.

“2nd. That French opium may be placed, as to quality, by the side of the best opiums from the Levant; the chances of adulteration being much greater for the latter.

3rd. That its extraction is lucrative and easy.

“By encouraging this new production, Government would render service to the country population. Women and children are more apt at this work than men. The most effectual means of encouragement would be to propagate information upon the subject, and to show the advantages to be derived from it, by every public means, in the departments where the poppy is cultivated. It would be sufficient to engage instructed teachers to

* MM. Bénéard and Deschamps assert that they have found from 16 to 22 per cent. of morphia in indigenous opium.

†. Bénéard, at Amiens, and M. Collas, at Paris, have intimated to the cultivators of La Somme, that all the opium which they collect will be received by them, at the price of 60 to 80 francs per kilogramme, according to its quality.

practise their pupils some hours for a few days in incising the capsules and collecting the juice. This time, otherwise lost by so many, would thus be utilized, and rewarded with immediate profit. As soon as the incision is made, the juice flows out and may be collected. In twenty-four hours it is dry; two grammes alone are worth fifteen centimes. A skilful laborer would collect from 50 to 100 grammes per day. The stock of tools required for the extraction is of the simplest kind: a knife, worth 60 centimes, and one or two plates, would be all that was necessary.

"The operation is most easy; it requires no dexterity; and it may be trusted, says MM. Bénard and Collas, to the most inexperienced hands."—*Lond. Pharm. Journ.* Oct. 1860.

ON PENGHAWAR DJAMBI.

BY DR. VINKE.

After reporting fourteen cases in which the hemorrhage from serious wounds or bleeding ulcers was promptly and permanently arrested by the application of penghawar, the author communicates the experiments made by him with a view to ascertain the *modus operandi* of this remedy. The treatise contains the following information:—

1. *On the phytography of penghawar (paleæ cibotii).*—The specimen examined by the author had been to the greater part separated from the stipes of the fern, and consists of delicate filaments, half an inch to two inches long, which are very soft, flexible, and so light that they keep themselves floating in the air for a long time. The shortest ones are thicker, dark grey or blackish, and are present in penghawar, but in small quantity. The longer filaments are silky, shining, tortuous, very delicate and of golden, light-brown color. It weighs so little that six grains constitute a considerable mass—sufficient to arrest bleeding from an artery one line in diameter. It swims on water, but falls to the bottom of the vessel after about half a minute, as it absorbs water; it gives an empyruematic odor on being heated, burns faintly on being brought in contact with the flame of a candle, and detonates under complete combustion, diffusing an odor like agaric. On microscopic examination, the author

found that the filaments of penghawar have nothing in common with hair. They form band-like, flat processes with articulations; their breadth surpasses their thickness three times and more. The joints are dark brown, resemble those of the shave-grass, but have delicate, often ramified processes. The part between the articulations is two to four times longer than wide, either of uniform width, or, in the dried state, conical, smaller at one end, of yellow color, translucent, covered with violet granules, which, together with the processes of the joints, fall off on applying a weak solution of caustic potassa, but becomes more distinct on being soaked in ether. The base of the filaments is either smaller, with branchy processes, or thicker, surrounded by hairs; their upper end is drawn out into a transparent, needle-shaped tubule. Each filament forms a hollow sheath which is partitioned by transparent diaphragms at the articulations. The cavity of the filament easily fills itself with any kind of fluid; fine powders do not penetrate into uninjured joints. In a solution of sulphate of iron the filaments become blackish, nearly opaque, and very brittle; if they have been previously soaked in ether, they assume a dark-brown color in the above solution. By iodine and dilute muriatic acid the physical properties of penghawar are not changed. A solution of caustic potassa becomes dark, the filaments themselves assume a bright-yellow color in it, are rendered very smooth and soft, in consequence of losing their granular cover and their processes. The author does not attach much importance to the chemical reaction of penghawar, and only states that it forms not a green (v. Bemmelen) but a dark violet, blackish precipitate with the salts of iron.

2. *Results of experiments on freshly abstracted blood, and on living individuals.*—All the experiments show that the hæmostatic effect of penghawar depends upon the capillary attraction of the water, which “exceeds the force by which the water in living blood is held in combination.” The coagulation of the blood (also of that which is freshly drawn) is the immediate consequence of the blood being deprived of its watery portion—a fact which is confirmed by comparative experiments with capillary glass tubes. Penghawar, however, acts with a five-times greater rapidity. A circumstance which promotes the

firm adhesion of the coagulum to the surface of the wound and the permanent occlusion of the orifices of the vessels, consists in the elasticity and delicacy of the filaments; on moderate pressure the latter penetrate into the finest interstices and apertures on the surface of the wound, and thus cause coagulation of the blood not only on the surface of the wound, but also in the interstices of the tissues next to it. But it is particularly by the following qualities that penghawar excels other hemostatics:—

(1.) It arrests, quicker than any other pharmaceutical means (agaric, sponge, bovista, &c.), parenchymatous, venous, or arterial hemorrhage, provided the diameter of the artery does not exceed one line and a half. [The Indians stop bleeding, also, from greater arteries with penghawar.] (2.) It produces a coagulum even in cases where the blood has changed so much that it has lost nearly the property of coagulating, or where the walls of the vessels are so diseased that they are incapable of a plastic process, as, for instance, in carcinomatous and scorbutic ulcers. (3.) Penghawar does not change the vitality of the wound or ulcer, and therefore does not exert an injurious influence upon the healing process.

Penghawar acts better when crumbled than if applied entire. It is to be kept in a dry place. Five grains are sufficient to arrest considerable hemorrhage; more than one scruple was never required. It is pressed for two or three minutes directly on the bleeding surface, after which, if possible, a compressive bandage or strips of adhesive plaster are applied over it, taking care not to draw the wound too much together. If the bleeding does not proceed from the whole surface of the wound, it is not necessary to fill out the entire cavity of the wound or ulcer with penghawar. The hemorrhage ceased more rapidly, if the author pressed the penghawar (in the form of a pencil) so upon the bleeding surface that the filaments were directed perpendicularly against it. The internal administration of penghawar, as recommended by Gaupp and others, is quite useless.—*London Pharm. Journ.* Oct. 1860, from *Med. Zeitung Russlands*, 1859, and *Schmidt's Jahr.* April, 1860.

OLEUM ÆTHEREUM.

BY EDWARD R. SQUIBB, M. D., of Brooklyn, New York.

“What are the changes which occur in the official Ethereal Oil (U. S. P.) by keeping; and can these changes be retarded?”

The above inquiry embraces two distinct questions; and in order to answer them separately with a useful degree of accuracy, a number of experiments were commenced soon after the last session of the Association. The result of these experiments, together with deductions from former experiments and observations, lead the writer to the conclusions now to be given.

“What are the changes which occur in the official Ethereal Oil by keeping?”

The sensible changes are a separation into two unequal strata. The upper one of these is commonly the smaller,—is of a deep brownish straw color,—of an oily character and consistence,—much lighter than water, and not miscible with water, having a fragrant aromatic odor resembling pennyroyal, and a somewhat pungent highly aromatic taste resembling essential oil of pennyroyal. It is slightly acid to litmus paper at first contact, but becomes strongly acid after a short exposure to air upon the paper, and is soluble in strong alcohol.

The lower and commonly the largest stratum is of a dark brown color, so dark as to be quite opaque,—is not of an oily character,—is much heavier than water, and when dropped into water separates into oily globules which sink to the bottom, and a soluble portion which dissolves and renders the water acid. It has a fruity apple-like odor, and a pungent acid taste. It is acid to litmus paper, effervesces with carbonates, precipitates baryta and lime salts even in the presence of sulphurous acid, and carbonizes organic matter when heated upon it. It is insoluble in strong ether, but is rendered soluble by the addition of a small proportion of the upper stratum.

Both the upper and lower strata are soluble in the spirit of ether used for the compound spirit of ether, whether added in succession or together; and when both are added they appear to reunite and form a compound spirit that is not sensibly different from that made from freshly prepared oil, except that it is very slightly tinged with a brownish color, and is slightly acid to litmus paper.

The character of the chemical changes which occur, are difficult to determine, and have not been studied with sufficient experiment and accuracy to warrant definite and precise statements concerning them. Therefore what now follows upon this point is to be regarded as the result of a judgment, based upon observations in practice, rather than as accurate results obtained by direct experiment.

The writer does not agree with those authorities who regard heavy oil of wine as a sulphate, or double sulphate, but rather with those who regard it as a sulphovinate of a hydrocarbon base, and for this prominent reason, that when pure and recent it fails in giving any of the characteristic reactions of sulphuric acid or sulphates.

If it be, as the writer believes it is, a sulphovinate of one or more hydrocarbon bases, the chemical changes which occur by keeping are probably, first, that a portion of the salt is decomposed by a simple separation into its proximate elements, just as chemically pure chloroform separates by keeping, and that after the separation a small proportion of the sulphovinic acid is reduced to sulphuric acid, and that this reproduced sulphuric acid reacts upon the more loosely combined hydrocarbons by separating and combining with the elements of water and setting the carbon free.

The upper stratum is therefore regarded as mainly composed of the hydrocarbon base with a little ether. The lower stratum as being mainly sulphovinic acid, or a lower sulphovinate of the hydrocarbon base, holding in solution a considerable proportion of the original heavy oil of wine, rendered acid by a small portion of reproduced sulphuric acid, and colored by free carbon. By supplying the matrix to the mixture of these two strata, namely, ether, they are made to recombine in the original form and proportion with the exception of the small portion which was decomposed into sulphuric acid water and free carbon, and the chain or circuit of the original compound is re-formed, and rendered permanent. If these views be true, the analogy with chloroform is very close and perfect in this respect, since, as the writer has elsewhere shown, decomposed chloroform may be regenerated and recombined by the similar use of its matrix, namely, alcohol.

The writer sees no reason to believe that in the changes by

keeping, any decomposition into ultimate elements, or any substitutions occur, with the exception of the reproduction of the small portion of sulphuric acid, and the well known effects of the presence of this acid when free in the presence of loosely combined hydrocarbons.

The practical deductions from the views here offered are that compound spirit of ether made from the officinal ethereal oil which may have undergone this separation is medicinally nearly equivalent to that made from the freshly prepared oil, the small proportion decomposed, and the slight acidity of such preparation might be safely disregarded in a medicinal point of view, particularly in view of the fact that the well made compound spirit of ether does itself become slightly acid by long keeping, especially when exposed to light and air. It is, nevertheless, much better to avoid all such changes whenever it is possible to do so ; and this introduces the second question of the inquiry entrusted to the writer, namely,

“ Can these changes be retarded ? ”

Upon this branch of the subject a number of careful experiments have been made, with results so definite and satisfactory, that it may be stated that, within the limits of the ten months allotted to the preparation of this report, an admixture of two parts of stronger ether with one part of ethereal oil, altogether prevents the separation and decomposition of the oil, although it does not prevent its becoming slightly acid to litmus paper. The circumstance that the action upon litmus paper is slight upon first contact, but increases rapidly on exposure to the air, renders it probable that the effect is due to the formation of acetic or some other organic acid from the alcohol and ethers present, as in the instance of sweet spirit of nitre, rather than to a decomposition of the heavy oil of wine.

Somewhere near the above designated proportion of ether is absolutely necessary to effect the purpose of keeping the oil, and it does not matter whether this proportion be diluted with alcohol or not, since alcohol has no apparent effect either to hasten or retard the separation of the ethereal oil. For instance, it was proved by experiment that no less than four parts of the spirit of ether used in making the compound spirit, was effective in preserving one part of the oil from the changes, and the steps of

this experiment shows that the separation is less as the proportion of ether added increases, quite independent of the amount of alcohol with which the ether may be previously mixed. This experiment proves conclusively that the opinion hitherto entertained and published by the writer that alcohol was a preservative agent was altogether erroneous. This error had, however, been detected in practice before the direct experiment was made.

It is useless to take up the time of the Association with a detail of the experiments made to determine the above points, and they were for the most part mere admixtures of the oil with different menstrua in different proportions, and were all based upon the well known fact that the oil when made at once into the compound spirit of ether keeps indefinitely. It is, therefore, judged sufficient to exhibit to the Association the various specimens which lead to these statements, together with specimens of the undiluted oil made at various periods during the past eight years.

A portion of the space saved by avoiding unnecessary detail of experiments may, however, be usefully occupied with some statistics of the process and results in preparing the officinal ethereal oil.

Since the last meeting of the Association the writer has used in preparing ethereal oil 1664 lbs. of sulphuric acid s. g. 1.845, and 686 lbs. or $100\frac{1}{2}$ gallons of alcohol s. g. .835. These materials yielded 87 fluid ounces, equal to 88.4 troy ounces, or 97 avoirdupois ounces, of the finished oil. The distillation occupied twenty-one days, one charge being distilled each day. It was performed in seven-gallon French white glass retorts, and the charges required from eleven to seventeen hours for working. Three retorts were lost in the process; one breaking in the sand pot,—the other two being broken in the difficult and troublesome cleaning that is necessary after each charge, to free them from the adhering carbonaceous matter and thiomelanic acid. These retorts cost seven dollars each, but prove to be more economical than those made in this country, from being less frequently lost in the sand bath. The charge lost in the sand bath took fire, of course, and was totally lost. Two more of the twenty-one were partially lost by frothing over the contents of the retort. The process required the almost undivided attention of one person, and a

troublesome expensive apparatus, and was not devoid of danger. Upon this scale, and with the best management that the writer's experience could suggest, the yield is by volume .684 per cent. of the alcohol or by weight .884 per cent.

In this process, as in all others where very large glass retorts are used with much handling, the larger the scale of operation within certain limits, the greater the loss. In the writer's experience the maximum yield is obtained in working the process with 2½ gallon retorts, as mentioned in a previously published paper on this preparation. But for a charge of this size, the time, attention and firing are so nearly the same, that it becomes more economical to get a smaller yield at a smaller expense.—*Proc. American Pharmaceutical Association*, 1860.

COLLECTION OF MASTIC AT CHIOS.

The mastic country, or rather that of the plant which produces it, the *Pistacia Lentiscus*, is especially the north of Africa, as well as some of the islands of the Grecian Archipelago, more particularly the island of Chios, which the Turks on this account call *Sachis Adassina*, that is to say, the island of mastic. Although this plant is found all about Greece and the islands of the Archipelago, and experience has shown that mastic may be always obtained from it by incisions, it is neglected everywhere, however, except at Chios, from whence comes in consequence all our commercial mastic. The villages where the inhabitants devote themselves exclusively to the collection of this resin are called *mastichochóra*, that is, mastic villages.

The incisions are made in the month of June with small knives especially adapted for the purpose, and towards the end of August they collect the mastic, which, having hardened on the plant, is readily detached. In order to gather it in a state of purity they spread under the shrubs some kind of cloth, as also some days before they take care to clean the soil, in order that it may not become attached to sand or other earthy impurities.

The smallest mastic, which is white and transparent, is reserved for the seraglio of the Sultan, and for the ladies of the

harem, who kill time in masticating this resin, and it is from its use for this purpose that mastic derives its name from the Greek verb, *massaomai*. The choicest quality is called mastic for the seraglio, *Fliskari*. It costs three or four times as much as ordinary mastic, which they use in the preparation of several preserves called *mastix glyko*.

In the East they use an infusion of mastic, *mastico-nexon* (mastic water) for infantile cholera, which consists in diarrhœa and vomiting, a disease of which many children die during the period of dentition, and for which medicines are not often of use. The Greeks also use mastic in the form of poultices, made with red wine and bread, which they apply over the lower-belly; these poultices are called *Krasocóma*, from *krasi*, wine, and *cómi*, bread.

They only adulterate mastic by mixing it with some that is older, and the fraud consists in this, that the last has lost with its transparency its odor and flavor. Mastic is always a dear article, and at Chios even the oke (2.8326 lbs.) is worth from 200 to 300 piastres or more. (From about £1 13s. 4d. to £2 10s.)

Mastic chewing being in general use, the poor have recourse to another vegetable production, which they call *pseudo-mastic*. This is a gummy secretion which is found between the segments of the calyx of *Atractylis gummifera*, a plant rather common in Greece and the East.

It is remarkable that they always use toothpicks of *Lentiscus* as in the time of the Romans, who called them *dentiscalpia* or *cuspides lentisci*.—*London Pharm. Journ.* Nov. 1860, from *Echo Méd. Suisse*, July, 1860; and *Journal de Pharmacie et de Chimie*, September, 1860.

KEKUI, OR KUKUNE OIL.

By M. C. COOKE.

Now that the oil of *Aleurites triloba* is spoken of so highly in France as a purgative oil, a few particulars concerning it may not prove uninteresting.

The plant producing the fruits from whence this oil is extracted,

belongs to the natural order Euphorbiaceæ, and is plentiful in the Sandwich, Society, and other groups of islands in the Southern Seas. It is also to be met with in some parts of Jamaica and the East Indies. The oil has been for some time known in Jamaica as Spanish walnut oil, and in India as Belgaum walnut oil. In Ceylon the oil is called *kekune oil*, and in the Sandwich Islands *kukui oil*. The tree is known in some parts of Polynesia as the candle nut tree. The fruits are nearly as large as a walnut, and the kernel is inclosed in a thick hard shell. These nuts are often strung together by the natives, and burnt, without any other preparation, as torches. In the history of the Mutiny of the Bounty, it is stated that the rooms in Pitcairn's Island were lighted up by torches made of "doodoe" nuts, strung upon the fibres of the palm-leaf, forming a good substitute for candles. These nuts are also so strung and used by the San Blas Indians in Central America, and a child is in attendance to knock off each nut as it becomes burnt out.

The following is the method adopted in obtaining the oil in Jamaica. Each nut is carefully cracked or broken, and the kernel as carefully separated from the hard shell, lest the latter, having a brown dye quality, should affect the color of the oil. The kernel is then put into a large mortar and pounded as fine as possible. It is afterwards thrown into a caldron with plenty of water and boiled. It is allowed to simmer for hours, until all the oil is well extracted and floats on the surface. Meanwhile, and until all is gathered together, the oil is skimmed off into another clean vessel. The oil thus collected is then boiled over again in a smaller vessel for a short time, in order to throw off any aqueous particles remaining after the first skimming. If the oil is not then perfectly pellucid it is run through blotting paper. Eight quarts of kernels will yield about three pints of oil. The yearly produce of this oil in the Sandwich Islands is about 10,000 gallons. It has been shipped to the markets of Chili, New South Wales, and London, but hitherto without much profit. It realized about £20 per imperial ton in London. In 1843, about 8620 gallons were shipped from Honolulu, valued at 1s. 8d. per gallon.

This oil has been used as an artist's oil, for which purpose it is said to possess valuable qualities, although it cannot be ap-

plied as a drying oil. It is only lately that attention has been called to its medicinal properties. It is purely purging, and, not like the croton, jatropa, caper-spurge, sandbox, and other euphorbiaceous oils, productive of vomiting at the same time. It is affirmed to be as mild as castor oil, and being more fluid, is better to take. It is without either taste or smell.

The nuts have, within the past twelve months, been sold in the London market under the name of kukui nuts, and there is no doubt that, upon inquiry, some of the oil could be procured, and it evidently well merits the attention of the profession. A purgative oil which shall possess all the advantages, and none of the disadvantages of castor oil, is a desideratum worthy of being secured.—*London Medical Review, and Pharm. Jour.*

SOLUTIO ATROPIÆ GLYCERINEA; A PREPARATION FOR THE
DILATATION OF THE PUPIL IN CATARACT, IRITIS, &c.

BY CHARLES R. C. TICHBORNE.

Since atropia was first brought into notoriety for the above application, by Reisinger, it has completely superseded belladonna where introduction into the eye is necessary, but the extract is still resorted to for painting the eyebrow and cheek in such operations as absorption of a cataract or anything similar, where it is indispensable in order to prevent adhesion of the iris to render the dilatation permanent; no preparation of the alkaloid yet introduced being applicable to the exigencies of such cases. A few of the objections to the use of the extract may be enumerated as follows:—Liability to produce cutaneous irritation; secondly, its requiring great attention in keeping the surface moist with some lotion to prevent its drying; and thirdly, want of cleanliness, as the extraneous matters of the inspissated juice are certainly very much out of place when manipulating with so delicate an organ as the eye; in some cases complete failure results either from the use of a bad preparation or non-absorption from harshness of the epidermis.

Some time ago glycerine was found to possess great solvent properties, particularly as regards the alkalaloids and some of the non-nitrogenous organic principles. The author has determined its action and solvent power in connection with atropia

with a view to its use as an elegant and efficient mode of exhibiting this substance where permanent dilatation of the pupil is requisite. A saturated solution in glycerine gave on analysis four per cent. (=gr. xvijss. ad. ʒi.) of the vegeto-alkali. It does not dissolve readily in the cold, but is soluble almost to any extent on applying a gentle heat; the excess, if it is not great, deposits on cooling in fine transparent colorless prisms, but if the amount is considerable it becomes when cool a solid mass. From this it is evident its solubility in glycerine is much greater than in water, it requiring 189 parts of the latter menstruum to dissolve it in the cold;* indeed the atropia is recoverable to a considerable extent by precipitation on the addition of water to the glycerolic solution. The easiest method of making this solution is as follows:—One decigramme (=1.543 grains) dissolved in a few drops of alcohol is added to 20 grammes (=368.680 grains) of distilled glycerine; the mixture is then subjected to a gentle heat, viz. about 110° F. for half an hour in an evaporating capsule to volatilize the spirit. This will contain one half per cent. *i. e.* 2.187 grains to the ounce, and may be labelled “Fortior.” On smearing the surrounding parts of his eye the writer found (without dropping in any solution) the dilation of the pupil perceptible in 15 minutes, from which time it steadily increased. A weaker solution, *i. e.* one containing one-fourth per cent. made by using one decigramme, to 40 grammes, may be used to determine the dilatation, by an unoccasional application, and also to allow for absorption. A solution in glycerine of atropia may be made contain 16 grains to the ounce, without any danger of its crystallising out.

The advantages to be derived from the use of this preparation, are, first, the emollient properties of the glycerine, which by softening and relaxing the scarf-skin, freely allows the ab-

* The author was induced to enter into the examination of the solubility in water from observing the non-conformity of works of reference on this subject. His experiments gave as a mean result 1 part atropia, to be soluble in 189, generally given as soluble in 300 parts, whilst Lowig gives it as requiring 2000; the writer thinks this must be a typographical error and must be intended for 200 parts. This diversity might be accounted for in some degree; as an amorphous modification, produced by the action of a gentle heat, is apparently much more soluble. This uncrystallisable variety is equally efficient with the other in dilating the pupil.

sorption of the active principle : secondly, the certainty of always keeping the alkaloid in the soluble form, and thus ensuring equal distribution from the hygrostatic properties of the glycerine, which could not be obtained from the use of any aqueous solution, even in the form of a malate, as in the extract, and also its ease of application, freedom from attention, as it always remains moist, and lastly, the certainty appertaining to the employment of all medicaments of a definite composition.—*Chemical News, London, October, 1860.*

ON THE PRODUCTION OF ALCOHOL IN THE UNITED STATES.

By FREDERICK STEARNS, OF DETROIT.

In regard to the questions referred to me upon Alcohol I have the following statement to make :

The points in the query relating to the *production* of alcohol, and the *statistics* of its commercial relations, are evidently the most important, the others being already exhausted in reliable chemical treatises ; hence I directed my inquiries to the former. I found the construction of a complete table of statistical information was, for various reasons, beyond my power, and that to await the results gathered by the decennial U. S. census (now recently taken) would give to statistical tables great accuracy. It is evident the region of the Ohio River valley contributes the largest share of whisky and its derivatives that is produced within the limits of the United States ; and the following, part fact and part estimate, copied from a letter of a reliable correspondent, is all I have to offer this year in relation to the matter.

The amount of whisky which finds a market annually in Cincinnati is about five hundred thousand barrels, worth on an average, one year with another, five millions of dollars. This amount is derived from Ohio and the States bordering the Ohio River. An estimate of the total U. S. product is one million five hundred thousand barrels. This estimate is based upon its average production in several States and not upon the receipts of the large eastern markets. The present annual manufacture of alcohol in Cincinnati will average forty-six thousand barrels,

worth one million eight hundred thousand dollars, estimated to be about one-fourth the whole amount made in the United States. This estimate makes the total average product of the U. S. to be one hundred and eighty-four thousand barrels, worth over seven millions of dollars. This estimate includes alcohol made for commercial purposes, for the manufacture of burning-fluid, and that purified for making domestic brandy and other liquors, and for exportation for the same purposes.

In Cincinnati the manufacture of alcohol has fallen one-half since 1858, when it reached its maximum. This is partly owing to the falling off in the foreign demand, which was large in 1858, but owing to a protective tariff it has been nothing since.

Whisky is produced from corn, rye, barley, middlings, (refuse from wheat in making flour,) and oats, the proportion being about eighty per cent. of corn, the remaining twenty per cent. equally divided between the others.

About one million one hundred and twenty thousand dollars capital is invested in the stills, fixtures and business of the whisky distillers, the product of which finds a market in Cincinnati.

In the manufacture of alcohol the capital invested in Cincinnati is three hundred and fifty thousand dollars.

The most notable impurity is the grain or fusel oil.

It has been asked me whether, for the purpose of manufacturing alcohol for burning fluid of high hydrometer-proof and yet comparatively low alcoholic strength, it could not by distillation in the presence of a small proportion of sulphuric acid, be contaminated with enough ether to heighten its proof without showing by hydrometer its real alcoholic strength. This query I cannot answer, but think it one worthy of investigation.

It is estimated that until the introduction of illuminating coal-oils, by far the largest proportion of the common alcohol produced was employed in the manufacture of burning fluid. Since, however, the largest proportion is employed under the name of pure and proof spirit in the manufacture of domestic brandy, gin, etc.—*Proc. American Pharmaceutical Association*, 1860.

ON POWDERED CAMPHOR AS A PHARMACEUTICAL
PREPARATION.

BY HENRY F. FISH, OF WATERBURY, CONN.

To the question, "*What is the most eligible method of keeping camphor, in the form of powder,*" I am prepared to give such an answer only as my own experience prompts; but to another question, "*What is the best method of obtaining Camphor in the form of powder,*" I can give a direct answer.

Take of Refined Camphor, ʒxvj . Troy.

Carbonate of Oxide of Magnesium, ʒj .

Alcohol, sp. gr. .818 Oij.

Water, Oviij.

Dissolve the camphor in the alcohol. Triturate the magnesia, in a porcelain mortar, with as much water as will enable the mixture to blend freely with the 8 pints of water; agitate the whole in a suitable wide-mouthed bottle until the magnesia is thoroughly diffused; add to this the spirits of camphor, in a thin, slow stream, constantly stirring the fast-thickening mixture. A dense, white, curdy separate ensues, which gradually condenses and rises to the upper strata of the alcohol and water. This may be collected in a paper filter, where it parts readily with its moisture. The camphor, now in a state of minute division, should not be pressed or much disturbed, but should be suffered to dry gradually; the mass may be cut into small pieces to promote desiccation.

If the process has been skilfully conducted, and the camphor allowed to part with its moisture spontaneously, without compacting itself, it now appears in the form of a light, dry, somewhat spongy mass, yielding to the pressure of the fingers, and capable of being reduced to a fine powder readily and rapidly. I have preserved camphor in this condition, for two years, simply excluding the light; if it is exposed to the light, it gradually sublimates and condenses to a small extent only. All risk of this kind may be entirely obviated by leaving the camphor *rather moist* than dry when bottled. In dispensing, I have used no other form of camphor for a year or more.

The magnesia should be of that form known in market as *S.S.* The quantity is so minute, being only one grain in 128,

as to form no sort of objection, while the diffusion of it in the water prevents, to some extent, the camphor from condensing in desiccation, and becoming very hard and difficult of reduction to powder. The London Pharmaceutical Journal, for July, 1860, has an article on the reduction of camphor to powder, by the addition of cold water, pounding it in a mortar, and sifting.

I have not been able to arrive at any satisfactory results by this method.—*Proc. American Pharmaceutical Association*, 1860.

ON THE CONSTITUTION OF DIGITALIN.

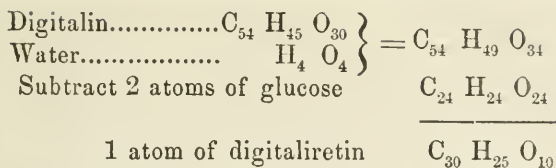
M. Kosmann has recently published an account of some experiments, undertaken by him with a view of ascertaining the action of certain reagents, principally sulphuric acid, on several organic principles. The result of his investigation has been to show that the bodies digitalin, santonin, guaicum and resin of scammony, have the composition of glucosides—a result which might have been expected from analogy, and which, in at least one case, has been already indicated.

Digitalin and the Products of its Decomposition.—The author having obtained pure digitalin, first satisfied himself, by the usual processes, that no nitrogen entered into its composition. He then boiled a given weight of the pure and anhydrous digitalin with diluted sulphuric acid for an hour or an hour and a half. After boiling for some time, a white flocculent precipitate formed, the liquid at the same time acquiring a yellow color. Upon collecting the precipitate upon a filter and weighing, it was found to amount on an average to 47 per cent. of the original substance. The filtered liquid was saturated with carbonate of lime or carbonate of baryta, to remove the sulphuric acid, filtered and evaporated down to the consistence of an extract. The residue was found to possess all the characters of grape sugar. It reduced the potassio-tartrate of copper and underwent fermentation, furnishing alcohol and carbonic acid. The weight of the residue, dried as far as possible, averaged between 57 and 58 per cent. of the digitalin employed.

It thus became evident that digitalin, in common with many other substances, is a copulated body, consisting of sugar combined with a new principle, for which the author proposes the name *digitaliretin*. The digitaliretin, which separated as a flocculent precipitate during the boiling, was purified by dissolving it in rectified spirit, filtering, slightly evaporating the solution, and allowing it to undergo spontaneous evaporation. A deposit took place after some hours, and ultimately a granular mass, of a greyish-white color, was obtained, which was redissolved in alcohol and again allowed to deposit. Brilliant grains of pure digitaliretin were so obtained.

This substance is almost insoluble in water, to which, however, it imparts a slightly bitter taste. It is only slightly soluble in ether and rectified spirit, but hot spirit dissolves it easily. The solution is bitter, although much less so than digitalin. It slightly reddens blue litmus paper. It is insoluble in the caustic alkalies. Its alcoholic solution is scarcely troubled by an alcoholic solution of acetate of lead, but upon evaporating the mixture a granular precipitate is produced, the liquid at the same time acquiring an acid reaction. By neutralizing this acid with ammonia, a copious flocculent precipitate is formed, which dissolves on boiling and reappears on cooling. When an alcoholic solution of nitrate of silver is added to a solution of digitaliretin, a precipitate slowly forms, composed of small brilliant prisms of digitaliretate of silver, which, by standing for some time, become brown, and on the application of heat undergo decomposition, with the deposition of metallic silver on the sides of the tube.

The author submitted both digitalin and digitaliretin to analysis. The composition of *anhydrous digitalin* accorded with the formula $C_{54} H_{45} O_{30}$. Hydrated digitalin contains eight atoms of water in addition, the whole of which are driven off at 100° C. Anhydrous digitalin is very hygroscopic, and readily attracts the above amount of water from the air. The analysis of *digitaliretin* gave numbers according with the formula $C_{30} H_{25} O_{10}$. By adding four equivalents of water to the formula of digitalin, the sum of two equivalents of glucose and one of digitaliretin are obtained; the decomposition of digitalin, as above described, is therefore readily accounted for.



Action of Caustic Soda on Digitalin.—The author next studied the action of a caustic alkali on digitalin. This principle could only be dissolved in a moderately concentrated solution of caustic soda by prolonged ebullition. The solution, when effected, had no action on potassio-tartrate of copper; no glucose, therefore, had been formed. Sulphuric or acetic acid was then added, and to the alkaline solution a flocculent precipitate obtained. This precipitate was dissolved in boiling alcohol, the solution filtered and evaporated to a syrupy consistence, when a white crystalline mass was obtained, having a piquant and slightly bitter taste, and an acid reaction on litmus. It consisted of a new acid, which the author has named *digitalinic acid*. The crystals of this acid, examined under the microscope, were found to be brilliant, translucent, micaceous scales. This acid, when treated with dilute sulphuric acid, immediately underwent the same decomposition as the digitalin; it was split up into glucose and digitaliretin.

Pure digitalinate of soda was prepared by boiling digitalin with a considerable excess of a strong solution of caustic soda for half an hour or more. A crystalline pellicle formed on the surface during ebullition. The solution was afterwards nearly neutralized with sulphuric acid, leaving it, however, slightly alkaline, so as to avoid the decomposing action of the acid on the digitalinic acid. The liquid was then evaporated to dryness, and the residue boiled with spirit, filtered, and the solution allowed to crystallize. A second crystallization furnished the salt in a state of purity.

These two decompositions of digitalin, the one into glucose and digitaliretin under the influence of a dilute acid, the other into digitalinic acid by the action of a strong alkali, show the great necessity for caution in the process adopted for its preparation and purification.—*Lond. Pharm. Journ. Sept. 1860, from Journ. de Pharm.*

SPONTANEOUS DECOMPOSITION OF CHLORIDE OF LIME.

BY DR. HOFMANN.

One morning (I think it was in the summer of 1858), when entering my laboratory, which I had left in perfect order on the previous evening, I was surprised to find the room in the greatest confusion. Broken bottles and fragments of apparatus lay about, several window-panes were smashed, and all the tables and shelves were covered with a dense layer of white dust. The latter was soon found to be chloride of lime, and furnished without difficulty the explanation of this strange appearance.

At the conclusion of the Great Exhibition of 1851, M. Kuhlmann, of Lille, had made me a present of the splendid collection of chemical preparations which he had contributed. The beautiful large bottles were for a long time kept as a collection; gradually, however, their contents proved too great a temptation, and in the course of time all the substances had been consumed. Only one large bottle, of about 10 litres capacity, and filled with chloride of lime, had resisted all attacks; the stopper had stuck so fast that nobody could get it out; and after many unsuccessful efforts—no one venturing to indulge in strong measures with the handsome vessel—the bottle had at last found a place on one of the highest shelves of the laboratory, where for years it had remained lost in dust and oblivion, until it had forced itself back on our recollection by so energetic an appeal. The explosion had been so violent that the neck of the bottle was projected into the area, where it was found with the stopper still firmly cemented into it.

I have not been able to learn whether similar cases of the spontaneous decomposition of chloride of lime have been already observed.—*Lond. Pharm. Journ. Sept. 1860.*

PARAFFIN—ITS SUBSTITUTION FOR WAX IN CERATES.

BY CHARLES T. CARNEY, OF BOSTON.

In reply to No. 13 on this subject, I submit the following remarks, which are necessarily very brief, not having had the opportunity of testing the question by actual experiment as to whether any therapeutic objections exist as to its use:—

I have made several experiments to test the availability of paraffin as a substitute for wax and also spermaceti in cerates, and am led to form the opinion that it is, to a certain degree, valuable as a substitute. The temperature at which paraffin solidifies after being melted, is so much greater than some other substances used in the manufacture of cerates and ointments, that this substance cannot be substituted in all cases for *both* wax and spermaceti, when those two are combined in ointments or cerates, but in many of these preparations that are comparatively solid at ordinary temperatures, my experiments would lead me to form the opinion that it may be used very conveniently and to advantage.

I submit herewith a sample of the Official Ung. Simplex, with an entire substitution of paraffin for white wax.

It will be seen that it forms quite a fair looking ointment.

For preparations of this kind, or those ointments that are colored by reason of their peculiar constituents, I should judge paraffin could readily take the place of wax.

I also submit specimens of Ung. Aquæ Rosæ made with certain amounts of paraffin in the place of wax or spermaceti. All these specimens differ from the official formula in containing glycerin in place of one half the quantity ordered of Aqua Rosæ; but a formula of precise composition accompanies each specimen, as to other ingredients.

SPECIMEN No. 1.—Contains paraffin in place of wax and spermaceti.

SPECIMEN No. 2.—Contains paraffin in place of spermaceti, with regular amount of wax.

SPECIMEN No. 3.—Contains an increased amount of paraffin and decreased amount of Oil of Almonds.

SPECIMEN No. 4.—Contains a large increase of paraffin, and Oil of Almonds decreased one half.

It will be seen that No. 1 forms a fair ointment; No. 2, in which white wax forms a part, is perhaps rather better; No. 3, containing a larger proportion of paraffin, with the regular amount of white wax, gives a very fair ointment, and I do not think the paraffin would be noticed, or be objected to, even when present in this quantity; an ointment made in this way would

be, in my judgment, very permanent, and keep a long time without becoming "rancid" or "ropy." No. 4 is made with a still larger amount of paraffin, and here the peculiarity of the cooling point is an objection.

You will notice the ointment is "granulated," and cannot be considered a good pharmaceutical preparation.

I have noticed that the presence of a small amount of white wax tends to make the paraffin much more "tractable," if such an expression is applicable; it seems to destroy in a measure the tendency to "granulate," and renders the paraffin much more tenacious.

In conclusion, I would offer as my opinion that paraffin may be used as a substitute for either wax or spermaceti in cerates, and that in an ointment containing a certain amount of water it is better to have a portion of wax retained as rendering the paraffin more available. As to the therapeutic objections to paraffin I can only say, that judging from the peculiar characteristics of this substance, I should suppose there would be no reason for any whatever.—*Proc. American Pharmaceutical Association*, 1860.

ON CARAGEEN.

BY AUGUSTUS P. MELZAR, OF BOSTON.

"To what extent is Carrageen collected on the coast of New England for the supply of Commerce?"

The red-colored algæ being abundant in the deeper and darker parts of the sea, the characteristics of the coast of New England naturally lead one to suppose that it may be found in this vicinity in great quantities and of the purest quality.

The Carrageen, or "Irish Moss," is gathered to a considerable extent in Massachusetts, but not to any amount in other parts of New England.

Along the south shore of Massachusetts, bordering upon the bay, the moss-gatherers during four months of the year collect the moss from the rocks, and from the beach, (where it is often landed after being torn from the rocks by the action of the sea,) and spread it high up on the beach to dry and bleach in the sun, thus preparing it for the market.

In the town of Scituate, Plymouth county, this business is carried on by natives of Ireland, who are located upon the cliffs, at the base of which is a bold rocky beach, where the moss is gathered in greater quantity than in any other part of New England.

It is estimated that in the town of Scituate, from three to four thousand barrels are yearly sent to the Boston and New York markets; from Cohasset and other towns in the immediate vicinity, one or two thousand barrels more; the total number of pounds being estimated at about five hundred thousand.

While the Carrageen is no doubt of the first quality, its market value depends upon the care with which it is prepared; thus its price varies according to the uses for which it is intended and by whom prepared.

The collecting of "moss" in New England for commercial purposes is of comparatively recent date, it being obtained almost wholly by Irish emigrants, who during a period of fifteen or twenty years, have landed upon our shores to pursue an occupation familiar to them in their native island.—*Proc. American Pharmaceutical Association*, 1860.

LITHIUM AND ITS SALTS.

This metal was discovered in 1817, by Arfwedson, in the mineral petalite. It exists also in spodumen, and lepidolite, and as a carbonate in many of the continental medicinal springs, viz., Carlsbad, Marienbad, Kreuznach, Aix-la-Chapelle, Kissingen, Ems, Tiplitz, Billin, Vichy, &c. Though so long known it was not introduced as a remedy for any specific diseases until Dr. Garrod wrote his elaborate treatise on gout, &c., in which complaint he attributes to carbonate of lithia wonderful and marvellous properties.

Lithium may be obtained, by galvanic action, from hydrated oxide, $\text{LiO} + \text{HO}$.

Davy ascribes to this metal properties analogous to sodium, and recent experiments tend to verify that assertion. In appearance it closely resembles silver, being of a beautiful white color. On exposure to the atmosphere it becomes converted into oxide. Its specific gravity is less than that of water, and

its atomic, or uniting proportion does not exceed seven on the hydrogen scale.

Oxide of Lithia.—Lithia is separated from powdered triphyllin, the most abundant mineral containing it, by digestion to solution in hydrochloric acid, and peroxidizing the iron with a little nitric acid. Dilute the liquid with water, and then add an excess of ammonia to precipitate the phosphoric acid and sesquioxide of iron. Through the ammoniacal solution pass sulphuretted hydrogen, to separate magnesia, filter, evaporate to dryness, calcine the residue to expel ammoniacal salts, and dissolve the chloride of lithium in alcohol. Upon the addition of an excess of carbonate of ammonia, a carbonate of lithia precipitates after a time, and must be collected on a filter, and washed with alcohol of 0.80 per cent. This carbonate, when finally powdered and boiled in a large quantity of water, becomes dissolved, and upon the addition of lime is decarbonated. The filtered solution, upon evaporation, yields hydrated oxide of lithia.—(*Booth.*)

This preparation is insoluble, or, at least, nearly so, and remains unaltered by all external actions. It possesses a disagreeable caustic taste; it is reactionary alkali, and readily attacks platinum.

Chloride of Lithium appears in crystallized cakes, and is soluble in alcohol and water. Unlike oxide of lithia, it is deliquescent on exposure.

Sulphuret of Lithium is soluble in water and alcohol, and eminently pyrophoric.

Sulphate of Lithia exists as a crystallized body, and remains unalterable by exposure. Its formula is LiO, SO_2 . It is soluble in water, and nearly insoluble in alcohol. With sulphate of soda it forms a double salt, $\text{NaO}, \text{SO}_3 + \text{LiO}, \text{SO}_3 + 6, \text{HO}$.

Phosphate of Lithia.—The neutral phosphate of this base, $2\text{LiO}, \text{PO}_5$ is almost insoluble. The bi-phosphate, LiO, PO_5 is very soluble in water, and crystallizable. With phosphate of soda it forms a double salt, soluble in 1400 parts of water at 59° , and in 950 parts at 210° . It is insoluble in all liquids containing phosphate. It is a white powder and has for its formulæ $2\text{NaO}, \text{PO}_5 + 2\text{LiO}, \text{PO}_5$.

Oxalate of Lithia.— $2C_2O_3, LiO + HO$, is a neutral crystallizable substance, soluble in water, unchanged on exposure, but decomposed by heat. The binoxalate is also a crystalline body, but less soluble than the former.

Nitrate of Lithia.—A powder, anhydrous, deliquescent, fusible, and soluble.

All the salts of lithia impart a red color to flame, and distinguish them from the salts of strontia in this respect. Chapman heats the suspected substance in a microcosm of chloride of barium, which prevents chloride of strontium from tinging the flame. If, while at the point of the inner flame, no redness is apparent lithia is absent, and the red first obtained from the mineral *per se* is due to strontia.—*London Pharm. Journal, from Dublin Hospital Gazette.*

ON HOPS AND LUPULIN.

BY CHARLES A. TUFTS, OF DOVER, N. H.

“It has been asserted that hops that have been used in obtaining the lupulin of commerce are afterwards sold as hops. Is the assertion true, and if so, to what extent is it carried on, and where; and what are the means of detecting the fraud?”

I have not been able to obtain such definite information as I could wish, in regard to this subject, and I do not think it would be easy to do so. So far as I can ascertain, it is not the practice with the hop growers and sellers in New England, and I cannot find with certainty that it is practised elsewhere.

I find there is an impression that it may be done, but I cannot learn where it is done, or by whom the fraud is committed. I have conversed with different hop-growers and dealers, and they have disclaimed all knowledge personally of such practice.

Hops, after being picked, are kiln-dried on frames, generally now by steam heat. The green hops are placed about a foot in thickness on the frames, and are often stirred to make them dry evenly. The lupulin was formerly wasted, but now most curers of hops suspend cloth under the frames, and save the lupulin which falls through.

In drying a bale of two hundred pounds weight, from one to two pounds of lupulin can be collected; to obtain more than

this, it would be necessary to pass the hops a second time through the kiln. In this way four to five pounds more could be obtained. The hops would be greatly injured by this process, not only by being deprived of the lupulin, or, as hop-growers term it, "the condition," but they would be very brittle, and would be so broken as to be unsaleable. One hop-grower told me, he did not believe this was practised, as he thought the amount of lupulin would not compensate for the labor and expense of this second drying.

There is a difference in hops raised by the same grower, for this reason. As the hops are dried, they are placed in a pile in the store or curing room, till all the crop has been dried: they remain here for several weeks, as the curers say to toughen; they are then pressed and bagged.

The hops at the bottom of the heap will thus have much more lupulin than those at the top, and be stronger and more valuable; considerable lupulin will be collected from the floor of the curing room, and the lupulin thus collected will be of the best quality.

I have heard that quantities of lupulin are separated specially for the supply of commerce, by threshing the hops after they are a year old, and then sifting the powder from the broken strobiles.

The hops thus treated are said to be put up in bags, and then sent to auction, and sold for what they will bring, without any explanation as to their inferiority. It may be these threshed hops are again damped and pressed into pound or half pound papers.

The best way of detecting the fraud would be to remove the contents of a package or bale, in small quantities; if there was little or no lupulin left, and the strobiles were much broken, it would show they had been exposed to the above treatment.

To determine the quality of good hops, not only the color should be examined, but the powder should be rubbed between the fingers; if the lupulin is abundant and feels clammy and unctuous, and is not too dark colored, the hops may be pronounced of good quality.—*Proc. American Pharmaceutical Association*. 1860.

WATER CISTERNS IN VENICE.

The French Academy of Sciences has received a communication from M. G. Grimaud, on the manner in which the Venetians construct their cisterns, a plan which he thinks might be advantageously introduced on the heights which overlook Paris, and are occupied by large establishments and a numerous population, and which would greatly benefit by them. Venice occupies a surface of 5,200,000 square metres (1300 acres), exclusive of all the great and small canals which intersect it. The annual average of rain is 31 inches, the greater part of which is collected in 2077 cisterns, 177 of which are public. The rain is sufficiently abundant to fill the cisterns five times in the course of the year, so that the distribution of water is at the rate of 16 litres ($3\frac{1}{2}$ gallons) per head. To construct a cistern after the Venetian fashion, a large hole is dug in the ground to the depth of about 9 feet, the infiltration of the lagoons preventing their going any deeper. The sides of the excavation are supported by a frame-work made of good oak timber, and the cistern thus has the appearance of a square truncated pyramid with the wider base turned upwards. A coating of pure and compact clay, 1 foot thick, is now applied on the wooden frame with great care; this opposes an invincible obstacle to the progress of the roots of any plants growing in the vicinity, and also to the pressure of the water in contact with it. No crevices are left which might allow the air to penetrate. This preliminary work being done, a large circular stone, partly hollowed out like the bottom of a kettle, is deposited in the pyramid with the cavity upwards; and on the foundation a cylinder of well baked bricks is constructed, having no interstices whatever, except a number of conical holes in the bottom row. The large vacant space remaining between the sides of the pyramid and cylinder is filled with well scoured sea sand. At the four corners of the pyramid, they place a kind of stone trough covered with a stone lid pierced with holes. These troughs communicate with each other by means of a small rill, made of bricks, and resting on the sand, and the whole is then paved over. The

rain water coming from the roofs runs into the troughs, penetrates into the sand through the rills, and is thus filtered into the cylinder or well-hole by the conical holes already described. The water thus supplied is perfectly limpid, sweet, and cool.—*Franklin Journal, from Journal of the Society of Arts.*

YELLOW POPPY SEED OIL.

M. Cloez, of Paris, has recently made known the result of some experiments relative to the Yellow Horned Poppy, *Glaucium luteum*, Scop., which I found on some parts of our shores. It is common all round the Mediterranean, and up the Western Coast of Europe to Scandinavia. It expands its handsome yellow flowers during July and August, which are succeeded by elongated capsules, containing a large number of minute seeds. These seeds lose only 8 per cent. water when dried in an oven; and, after drying, contain 42 per cent. of a siccative oil, which can be used as an aliment, or for burning. In its ordinary state the seed yields by pressure 32 per cent. of this oil. The marc, or residue, constitutes a valuable manure, giving, on analysis, six per cent. of nitrogen, and an ash, amounting to $14\frac{1}{2}$ per cent., rich in phosphate of lime. This oil, without doubt, resembles greatly the poppy-seed oil, obtained from *Papaver somniferum*, and the plant might be cultivated for the sake of its seed on our sandy shores, where nothing else remunerative can be produced, but we question whether it would yield anything like as much seed per acre as the opium poppy, and, therefore, whether it would pay to cultivate it for that purpose. M. Cloez's results, however, are worthy of being recorded.—*London Pharm. Journ. Nov. 1860. from The Technologist*

HYPOCHLORITE OF ALUMINA.

Orioli recommends hypochlorite of alumina to be used as a bleaching and disinfecting agent, instead of the hypochlorite of lime and soda. It destroys more promptly, he says, organic coloring matter and gaseous matters of a mephitic nature.—*Chem. News, London, Oct. 13, 1860.*

ON THE PROXIMATE ANALYSIS OF PLANTS AND VEGETABLE SUBSTANCES.

By FREDERICK ROCHLEDER, M. D.

INTRODUCTION.

The medicinal action which many plants, or parts of plants, possess, may have been principally the earliest occasion of the examination of plants. It is probable that the analysis of plants, and particularly of their sap, was the first original labor in relation to analytical chemistry, when the term analysis could be scarcely employed in the sense which we attach to this word at the present time. Indeed, some derive the word "Chemistry" from *χυμος* (the sap), because the sap of plants had been the object of the earliest chemical research. The applicability of many plants to technical purposes was the later and profitable occasion for the analysis of plants and their parts. It is, therefore, evident why the earliest labors were not directed to discover all the constituents of a plant or of its parts, but had for their object the isolation of one or the other of its constituents. Chemists endeavored to isolate the medicinally active substance, or the poison of medicinal or poisonous plants, and the substances, as coloring matters, tannin, &c., of plants, used for industrial purposes, and on these accounts employed. Nevertheless, we very seldom find analyses of all parts of a plant; mostly, analyses were preferred of those parts of plants which were employed in medicine or in the arts. All analyses were undertaken from views which must remain foreign to chemistry as a science, which proceeds without regard to medical or technical objects. Another period commenced first in more recent times in the investigation of plants, in which the former predominating views were more and more thrown into the background; chemists became sensible that one constituent of a plant possessed for the plant the same degree of importance as any other, quite independently of its applicability to different objects. They perceived that all the constituents of a plant must stand in the closest relations to one another; that one is formed from the other, that the existence of one constituent could not be regarded independently of the existence of the others, and that all constituents are links of one chain. The principal result of these new views was an alteration in the method of investigating plants; it could no longer be said to be a one-sided endeavor for the isolation of a substance with a disregard to all other simultaneously existing constituents. It became necessary to search for all the constituents of a vegetable substance by analysis, and to study them closely. The inquiries concerning the process by which one constituent is formed from others, and, according to the nature of the affinities, is converted

into other substances, have rendered requisite more correct analyses with reference to all the constituents.

The first efforts of chemists in the analysis of plants and their parts were limited to the separation of their constituents from one another, as far as it was possible, by their different behaviour to solvents. The substances thus separated, often still a mixture of several bodies, had a peculiar name conferred on them, but their composition, their relation to other bodies, with the exception of some observations concerning their color, or the precipitates produced by the addition of reagents, were not further investigated. From a resemblance in the properties of individual constituents with bodies already known, their identity with the same was decided upon. While some chemists rather predicted than were able to detect an unlimited quantity of different bodies in various plants by a great number of analyses in the highest degree imperfect, others proceeded to examine more closely the detected constituents individually. It was quite in the nature of things to be expected that for the investigation of the composition and constitution of their individual constituents, those bodies in particular should be selected which from their properties appeared to give a guarantee of their purity by reason of the facility with which they could be isolated and purified. For example: volatile oils, by the facility with which they are volatilized undecomposed, and are separated at certain boiling points from other volatile substances with some precision; also crystallizable bodies of some permanence which may be easily separated from other amorphous substances by their disposition to assume the crystalline form. These were the objects of attention to those men of science who expected more benefit to chemistry from a fundamental study of some substances than by the discovery of many. Thus, then, it happens that besides some few well-conducted analyses of vegetable substances, we possess a great mass of imperfect analyses, and sometimes an exact chemical investigation of one or the other constituent of a vegetable substance, in which the remaining constituents have received no consideration. There exists, at the present day, no investigation of the various parts of a plant which has been completed so that, uniting the details of each investigation of all the constituents to a whole, it could give us a representation of the constitution of the plant.

The investigation of an individual constituent of a vegetable often requires a long time, and a great expenditure of patience and sagacity, not to speak of the pecuniary sacrifice combined with it. For these reasons few of the substances have been at present examined in comparison with the number whose existence is already known. But an exact and complete analysis is endlessly troublesome when the nature of the constituents are not known. To this is to be ascribed the few analyses we possess which correspond to the acquirements of science. For an analysis which informs us what constituents a plant contains in its various parts.

and in what quantity they are present therein, we seek in vain in chemical works.

As we find only some analyses of plants which possess a value, when we examine the long series of such analyses, so also we search vainly for a definite method according to which they could be arranged. There is no difficulty in explaining why no method is given for the analysis of plants such as we possess in mineral chemistry. Inorganic analysis is, in general, the analysis of defined compounds, the properties of whose elements are, for the most part, correctly known, and likewise the properties of their most important combinations with one another. When the analysis of plants treats of the analysis of mixtures which cannot be separated mechanically, then terminates the precision and certainty of inorganic chemistry, which we only can boast of in its relation to elementary analysis. The investigations of the various minerals, as phonolithe, &c., show how little we know of the means of separating the individual constituents. Every part of a plant is a mixture of many constituents not mechanically separable, the number of contemporaneously existing constituents of such a mixture being infinitely greater than in the most complex fossils. If it be difficult in this case to find out a method of separation, how much more difficult will it be with plants, whose principal constituents are so readily decomposable and changeable that they may be altered not only by the reagents employed for their separation, but act reciprocally on one another, producing bodies which were not originally present.

When we have to deal, in the analysis of plants, with known compounds, as is mostly the case in mineral chemistry, still the investigation is not easy. In the analysis of a vegetable substance heretofore unexamined, we can reckon almost with certainty on meeting with one or more quite unknown bodies. The intimation which has been already often expressed, that a rational method for the analysis of plants is quite impossible until at least we are correctly acquainted with the majority of vegetable bodies, is, consequently, not without some foundation, for only when we know the properties of the constituents of plants and their combinations, can a method be established which will be available for all time. Consequently, both for the present and the next century we must renounce the hope of a permanent and rational method of vegetable analysis, as it is scarcely possible, in a shorter space of time for chemists to study correctly and copiously enough the majority of the constituents of plants. The number of plants is great, and increases yearly by fresh discoveries, and with the number of plants the number of peculiar vegetable substances also increases. Therefore, if we would wait for the establishment of a method of vegetable analysis until we are acquainted with the majority of all vegetable bodies, we should never arrive at one, because we can only learn the properties of these bodies by organic analysis, and to investigate plants without some such method of analysis tends to aimless researches. However, this is clear,

that every method of vegetable analysis which is arranged for the present, must be only a provisional one, to be made more comprehensive as soon as the knowledge of the constituents of plants has been extended by its aid—in other words, the provisional method is the means to arrive at better methods.

With the majority of the older analyses of vegetables the foundation of the process was the application of different solvents in succession. Ether, alcohol and water were the solvents most commonly employed. In many cases, the residues were brought into contact with dilute acids and alkalies, generally with the assistance of heat, after having been more or less exhausted with the three fluids mentioned. In consequence of the facility with which many substances are transformed into others by the action of acids and alkalies in the heat, these latter methods of treatment often gave rise to incorrect views of the composition of the plants, or those parts under examination. The treatment of the substance to be examined in succession with ether, alcohol, and water, would have afforded much better results, as in fact was mostly the case when two conditions which did not prevent a complete separation in this way, were not sufficiently attended to and calculated upon. These conditions are the following: the exhaustion of the substance under examination with one fluid must always be imperfectly effected before the second is allowed to act thereon. We cannot so prepare the material that each individual cell and its contents are exposed to the action of the solvent, because the material reduced to an impalpably fine powder, and exhausted with a solvent, affords again to the same solvent substances after it has been freshly triturated. Thus it happens that there are always bodies retained in the substance under examination after its treatment with a solvent which are soluble therein. If we now bring the substance in contact with the second solvent, the bodies not only will dissolve that we intend therewith to extract, but often also the remainder of the bodies which the first solvent left behind. The same holds good with regard to the third solvent. A solution of certain bodies by a solvent will afford thereby no means in many cases for the separation of other bodies which are insoluble in this solvent, because frequently substances which are *per se* insoluble in a liquid, are not insoluble in a solution of other substances in the same liquid. In this way we obtain, in a watery or alcoholic extract of a vegetable substance, bodies which *per se* are insoluble in water or alcohol, but which, by the agency of other bodies, are dissolved therein. Independently of these detrimental circumstances, which are produced by an incomplete exhaustion with one liquid before the application of a second solvent, there is associated the condition that the exhaustion with a liquid, at the same time, produces a solution of bodies which should not dissolve, because they are held to be insoluble therein. But what is termed insoluble are, in the majority of cases, only very difficultly soluble substances, that is, such substances as require a large

quantity of the liquid when a little shall be dissolved therein. However, when it is desired to exhaust as much as possible a substance by means of a liquid, it is necessary to employ a large quantity of the liquid, as it is essential to effect the extraction with renewed portions of the solvent. In so great a quantity of liquid, a quantity not inconsiderable of the very difficultly soluble bodies dissolve, which, by the concentration of the liquid, are often prevented from being separated by other constituents, thus rendering impure, in a serious degree, the substance which we wish to extract free from the other constituents.

The method for the analysis of plants, given in the following pages, depends on the treatment of materials with various solvents. Every resulting solution then undergoes a further appropriate treatment therein. It must be here mentioned that the preparation of some of these solutions, and their further investigation, promise no certainty, and that only by a comparison of the results which are obtained by the investigation of all the individual constituents, separately and collectively, can we deduce a correct conclusion on the constitution of a vegetable product.

It would have been, as every competent judge will concede, a perfectly unfruitful, useless labor, to publish, as far as it is known, the behaviour of all known constituents of plants with reagents; and more so, because we would but deceive ourselves or others if from the apparently identical behaviour of two analogous bodies with some reagents a conclusion with regard to their identity should be drawn. Only by identical composition, surely established by elementary analysis, the identity of reactions proves something; through the attempts at recognizing and detecting in a mixture of bodies the individual constituents by their behaviour with reagents without further corroboration, have arisen numberless false statements. Malic acid, gum, &c., are stated to have been found as constituents in numerous plants. Whoever has carefully tested these statements will find, by a repetition of the analysis, no malic acid, and convince himself that the supposed gum is a salt of an organic acid with an inorganic base, which possesses no remarkable taste, dries to a gum-like mass, dissolves in water, and is precipitated by alcohol therefrom in white flocks, &c. To prove that a body, which has been obtained by analysis, is identical with an already known substance, the elementary analysis of this body, or one of its suitable combinations, must be undertaken. Only the reactions of substances rendered pure, deserve in this respect consideration, not the reactions of mixtures. Without elementary analysis, in regard to identity, only a high degree of probability can be arrived at, but no certainty. But an error, in a high degree probable, is more dangerous than a palpable mistake. Elementary analyses, which alone bestow a value on the identity of reactions, are, besides, the least difficult and tedious part of the labor. They require no great amount of ability. This is only necessary for the preparation of the substance to be analyzed.

SECTION 1.—*Mechanical treatment of the material preliminary to its investigation.*

When we desire to be able to learn the composition of a vegetable substance, the first requisite is to simplify and facilitate the subsequent chemical operations by a suitable mechanical preparation of the substance to be examined.

If we were in a position so to dismember a plant that only its equally similar cells were separated and subjected to a chemical investigation, not only would the analysis be thereby greatly simplified, but a source of error would be quite removed—the formation of bodies not originally present, by the action of the constituents of dissimilar cells on one another. But such an anatomical preparation of the material for the subsequent chemical investigation is an impossibility. Now, as the separation of the individual tissues of a plant, at least of such a large quantity of the material as we require for a chemical investigation, belongs to the limits of the impossible, we must accomplish at least the possible in this respect by the mechanical separation of the parts as completely as practicable. How far this can be effected in certain cases depends on the structure and anatomical relations of the substance to be examined.

To render the substance intended for examination suitable for treatment with liquids, it must be comminuted. The more points of contact presented by the material to the liquid, the better it is. The comminution cannot easily be carried too far with materials which cannot be penetrated with the liquid which is intended for their extraction. In this case merely moistening of the surface of the smallest portions takes place. The smaller these portions, the greater the surface, the more completely the extraction with the solvent is accomplished. With a material which is readily penetrated with the solvent employed, a careful comminution is superfluous. In so far as a substance swells up by means of the fluid used for its extraction, its minute division is objectionable. Under such circumstances a gelatinous mass results, which absorbs and retains much fluid, the solvent cannot be separated, and when pressure is employed for this purpose, the pasty mass escapes through all the pores of the press-cloth.

Frequently a very fine powder of the substance cannot be prepared on account of the peculiar tenacious property of the material. Nevertheless, if it be desirable to divide such a substance as much as possible, it may be often readily effected after the removal of the greatest part of several constituents.

Often a certain degree of moisture, the presence of water, renders the substance tenacious and elastic, so that it is difficult to pulverize it. A careful drying suffices in such cases to deprive the material of its tenacity, and to render it pulverizable. For example, it is extremely difficult to beat to a fine powder coffee beans in the condition in which they exist in commerce. However, this is easily effected when they are exposed for several

days to a temperature between 140° and 150° Fahr., and thereby rendered free from a portion of their hygroscopic water. The presence of a fatty oil oftentimes makes the substance to be examined tenacious; after the expression of the oil from the coarsely powdered material, the residue can then be finely divided.

When resins or fats in smaller quantities are the cause of the tenacity and elasticity, the comminution of substance may be effected by first removing, by a suitable solvent, the objectionable portion of the constituents from the coarsely powdered substance, then drying it, when it can be finely divided.

The pulverization is always facilitated when it is accomplished by stamping or rubbing, by separating the coarser from the finer particles by means of a sieve, and repeating the operation on the coarser portion.

Whether a substance is to be reduced to a fine state of division by stamping, rubbing, rasping, cutting, or crushing between rollers, depends on its properties, and no instructions can be previously given here in this respect. The apparatus required for these operations are so well described in various works, and rendered intelligible by the aid of engravings that it appears superfluous to enter more closely into this matter.

Before the pulverized material is treated with appropriate solvents, it is advisable in all cases to observe whether it is not possible by expression to completely separate certain constituents. In the investigation of vegetable substances which contain liquid fats, or fats fusible at a moderate temperature, a great portion of the fat may be separated by cold expression, or by plates heated to 212° Fahr. In the investigation, the advantage is not only thereby gained that a considerable quantity of fat is separated from the other constituents, but many other advantages are thus attained in the further treatment of the substance—for example, in its extraction with water as well as with alcohol, as the presence of a large quantity of fat occasions many inconveniences. The watery decoction, as well as the watery residue, which remains behind after the expulsion of the alcohol from the extract prepared with spirit, is rendered, with materials rich in fat, often turbid, and cannot be obtained clear by filtration. With such liquids the filtration proceeds with extreme slowness. This disadvantage is everywhere evident when saponin or analogous bodies are present in solutions, which divide the fat so finely and suspend it in the liquid, that it passes through a moist filter simultaneously with the liquid. Even when the liquid can be obtained clear by filtration, its filtration is very much retarded thereby, and the opportunity to decompose is afforded to the dissolved substances. When a turbid fluid, containing fat, is mixed with a saline solution to produce a precipitate, the precipitate mechanically throws down the fat, becomes so pasty in consequence, and difficultly divisible in water, that its solution in acids, its decomposition by a current of gas, and by other agents, are very difficult to be accomplished. There often

remains no other means for the separation of the fat than to precipitate a portion of the constituents, which are dissolved in the fatty liquid by a reagent, and then to filter the liquid. It is evident that by this method of separating the fat a portion of the other constituents are sacrificed. It is advisable to avoid such loss when it can be prevented.

SECTION 2.—*On the nature of the substance to be examined, and on the quantity required for its investigation.*

If we desire the investigation of one, several, or all the constituents of a plant, by means of analysis, we should endeavor to obtain the material for the investigation in the freshest condition possible. I have had occasion to convince myself that some fresh vegetable substances, even when most carefully dried and preserved, did not, after some months, contain even a trace of several bodies which were easily detected in their recent state. It is often impossible to use the material in a fresh state for investigation. When plants or their constituents have to be examined, which are brought from distant countries, we must be contented to obtain them in the best possible state of preservation, as it is not possible to draw with full certainty a correct conclusion from the composition of such dried materials as to their composition when in a fresh condition. Indeed, such investigations are calculated to afford very useful results in pharmacological, dietetic, or industrial relations, because the materials are employed in the same condition in which they are investigated; but they are not suitable for giving a representation of the true composition of the living plant. Chemical changes often proceed on keeping the plants without observable external alterations, and the composition resulting from these changes is then often regarded as the original one. Consequently, when we are in a position to select the material for the analysis of a plant, and are not compelled to employ for the investigation vegetable substances which we cannot procure in a fresh state, it is always most convenient to select such plants or their parts as can be obtained in a fresh condition, which enable us to undertake the investigation at places not far distant from where they grow. Only in these cases are we sure to obtain a correct result from a correct analysis; that is, to be able to learn the true composition of the living plant. Results are only obtained in this way, which, in vegetable physiology or botany, are truly trustworthy. It would appear, from what has been stated, that the field of activity is a circumscribed one; but this is not so. We know the composition of plants which grow in our immediate neighborhood, less than that of many others. The tree under whose shadow we walk, as well as the vegetable we tread upon in our path, are chemically unknown things. We know the salicin of the willow and the populin of the poplar, we know the amygdalin of the almond and the volatile oils of the chamomile and the sage, but a representation of the composition of those plants we have not. He who knows the composition of oil of valerian, knows nothing of the composition of the

(To be continued.)

Editorial Department.

ROCHLEDER'S PROXIMATE ANALYSIS OF PLANTS.—We commence in this number the publication of Rochleder's work on the proximate analysis of vegetable substances, which we propose to continue in future numbers regularly. We have a manuscript translation of the entire work, by Mr. John M. Maisch, which we propose partially to employ, and partially to avail ourselves of the translation now being published in the *Pharmaceutical Journal*. The work, when completed, will afford a valuable source of practical information on this difficult subject, heretofore almost inaccessible in English books. (See page 81.)

NEW WEIGHTS OF THE BRITISH PHARMACOPŒIA.—The subject of Weights and Measures is always one of paramount importance to the Pharmacist: without these useful aids we cannot conceive of accuracy or scientific precision in our processes; yet it is so difficult to effect reforms involving a change in the general customs of trade, that the greatest inconveniences are submitted to, rather than interfere with them.

In England and the United States the anomaly exists of using, or professing to use, among Druggists and Apothecaries, one system of weights for buying and selling and another for mixing and combining, a custom entailed by early English sovereigns tampering with the silver currency, which at that time regulated the weights and measures. The greatest evil of this anomaly stated in brief is this:—The National Pharmacopœia processes all require troy weight. Carelessness or ignorance, or interest, induce a large number of Apothecaries and Druggists to use the avoirdupois ounce of $437\frac{1}{2}$ grains, and its divisions, in lieu of the troy ounce of 480 grains. To avoid this evil, the Committee now engaged in revising the British Pharmacopœia early considered the various remedies which had been proposed, and finally adopted the suggestion of Dr. Charles Wilson, of Edinburgh, the Secretary of the Scottish branch of that Committee, which virtually remedies the difficulty by having but one system of weights for use in Pharmacy,—the avoirdupois weight, now universally employed in general trade. But the minor divisions of avoirdupois weight are not sufficiently minute to replace the Apothecaries weight, and the chief point in the proposed change is that the Avoirdupois ounce of 437.5 grains be divided precisely as the present Apothecaries ounce, into 480 parts to be called grains, 20 of such grains to make a scruple, 3 scruples to make a drachm, and 8 drachms to make an ounce: above which the divisions are the same as in the avoirdupois table.

Now the great merit of this proposition is, that it does not change the

name of a single division of weight; and only their value to the extent of about nine per cent. less than that of the present Apothecaries weight. The change to a less value is on the side most favorable to their adoption, by a certain class of dispensers, who designedly use the avoirdupois ounce, because it is less, and who are not few in number. The medical profession have of latter years shown a tendency to decrease doses; and it is believed that they could substitute the new weights in practice without any inconvenience to themselves or their patients, even if no allowance be made for the difference, but it would soon be seen that the equilibrium would be regained. If 10 troy grains of Calomel are necessary to effect a given purpose, 11 of the avoirdupois grains could be used as practically equivalent, and so of other quantities. The language of the Pharmacopœia need not be changed in a single process, except in regard to the word pound, which if retained would signify 7000 troy grains instead of 5760 as at present. Now as this present word pound in reference to the Apothecaries weight is often the cause of great errors in compounding, its use for the next ten years might be dispensed with, expressing all large quantities in ounces.

We now come to the main argument which has been used against this innovation, viz., the abandonment of the *Troy grain*, upon which rests both of the present systems of weight.

In reply to this, we will urge that it is not proposed to change the Troy grain, which is really no part of the avoirdupois system, but only to create a new grain which will bear a certain fixed relation to the Troy grain, and which there is just as much propriety in its possessing, as in its having a peculiar drachm or ounce. In fact, the argument against it applies with equal force to the centigramme of the Decimal system, which finds many advocates, and which is far less approximative in character to the Troy weight. It will be asked how will it work in practice? how do you propose to effect the practical introduction of the new grain? In reply, we say as follows. Down to the eighth of an avoirdupois ounce we are already provided. Let our Colleges of Pharmacy make arrangements with any manufacturer of weights to provide the new weight from the drachm down to the grain, and its fractions if needed, and supply them at cost to all applicants. Every apothecary would desire to retain a set of small troy weight for use in the old formulæ, and the small cost of the minor new weights would be so trifling that none could object. These views were advocated in the Pharmacopœia Convention at Washington, and at the New York meeting of the Pharmaceutical Association: and ten years ago, whilst serving upon the Committee of Revision of 1850, we expressed an opinion favorable to the Dublin weights as preferable to the retention of two systems in practice. The subject has been revived by the reception of a letter from Dr. Charles Wilson, of Edinburgh, manifesting much interest in regard to the adoption of the new weights in our Pharmacopœia, as

a step highly conducive to uniformity in practice, because the formulæ of the two countries are constantly used by each other, and more particularly the British formulæ by us, owing to the large amount of English medical literature in use in the United States. As we are equally anxious that this assimilation should take place, we take the liberty of introducing a quotation from Dr. Wilson's letter bearing on the subject.

"It was in the beginning of March of last year, that I brought before the Scottish branch of the National Pharmacopœia Committee, of which I am Secretary, what purported to be a proposition to change the grain weight for solids in medicine, so as to render it an integral part of the Imperial or Avoirdupois weight, and thus assimilate properly and fundamentally, the medicinal weights for solids and fluids, at once with each other, and with the ordinary commercial weight. A sub committee was immediately appointed to consider it, and the plan was directed to be communicated to the two other committees in London and Dublin. The opposition was at first strong in all the committees; but in the month of April, the Edinburgh committee agreed, on the motion of Prof. Christison, to recommend the plan for adoption, as the best under the circumstances; and this determination was followed by an expression of full concurrence from the Scottish branch of the Pharmaceutical Society. The opinions of the other committees rapidly came round; and finally, at a convocation of the whole, held in London, in May, my suggestion was formally adopted. In an attempt at that time, which I was desirous to make to convince the Pharmaceutical Society of London, I had the same success at the commencement that attended me in all the others; though I had at once here the advantage of the support of Dr. Redwood, their able Professor of Pharmacy. In June, 1859, this gentleman further wrote to me, that the inquiries he had recently made had tended greatly to strengthen the opinion he previously entertained, that the use by druggists of two sorts of weights, agreeing in name but differing in value, leads to much inaccuracy in the preparation of medicines, and that he knows of no better way to remedy this evil, which he designates as one of great magnitude, than that which I had suggested."

Our readers will thus see that, in all probability, the new British Pharmacopœia, which Dr. Wood writes may be expected at latest in October next, will contain these new weights, and in view of that it cannot but be manifest that their adoption in the U. S. Pharmacopœia would be a step in the right direction. We know that very able and influential opponents of this proposition exist among us, but as yet but little expression has occurred, and one object of this notice is to request the thinking members of the Medical and Pharmaceutical professions to manifest more interest in a subject that so vitally concerns them. Our space is so limited in this number, that these remarks are necessarily curtailed, but we hope in a future number to recur to the subject, and meanwhile ask its consideration by our readers.

THE UNITED SOCIETY OF CHEMISTS AND DRUGGISTS.—It is well known to a large number of our readers that, since 1841, an influential Association has grown into existence in Great Britain, called "the Pharmaceutical

Society," consisting originally of the better educated pharmacutists, who by association aimed at raising their body to a professional rank by a most earnest course of endeavor to encourage education and good practice among the dispensers of medicine. The early labors of these men, among whom the late Jacob Bell occupied so prominent a position, at last succeeded in gaining the recognition of Parliament, who by an Act granted certain powers to this Society, which, whilst they were far more limited than the applicants desired, yet conferred upon the Association a position and influence that have done much to advance the cause of pharmaceutical education in that country. Among other rights and privileges granted in the Charter, is that of making the name "Pharmaceutical Chemist" a title belonging only to members of the Society, no other dispensers having the legal right to employ it. Numerous as are the members of the Society, it by no means includes all the reputable pharmacutists, some refusing originally to join the movement from various motives, until the period arrived when none could join without submitting to an examination, a course very repugnant to many men who consider themselves qualified by long service. This feature, and the fact that the Pharmaceutical Society is not slow to draw the line between its members and the outsiders so distinct as to influence the public, has begotten a feeling of union among the "Chemists and Druggists," as they call themselves, which has resulted in the formation, or rather the commencing steps to the formation of a distinct Society, called "The United Society of Chemists and Druggists," to which the annual subscription is but five shillings sterling, about a dollar and a quarter. So far as we can learn from the pages of the "Chemist and Druggist," only the initiatory steps have been taken. Mr. C. T. Buott, the Secretary *pro tem.*, has been engaged in an active canvass, by letter, among the trade, with a view of getting as numerous an adhesion as possible, believing, as did the early supporters of the Pharmaceutical Society, that numbers were of the first importance in giving force and influence to the movement. In pursuance of this idea, Morgan & Brothers, the publishers of the "Chemist and Druggist," and the great druggists' sundries men of Bow Lane, London, have offered to give the Society five hundred dollars, if by Christmas the number of members reached one thousand. We have not been able to meet with a clearly defined view of the *modus operandi* proposed for this new Society, nor are we aware of the exact limits of qualification for membership its founders propose,—whether druggists, or manufacturing pharmacutists, properly so called, on the one hand, and druggist grocers on the other, will be included or excluded,—but the following, taken from "the preliminary prospectus," issued in August last, will give some idea of their aims :—

"United Society of Chemists and Druggists."

"The promoters of this Association, feeling impressed with the fact that so numerous and intelligent a body as the Chemists and Druggists of the

United Kingdom have no organization that fairly represents their interests as a trading community, propose that this Society be formed, having for its objects—

1st.—The establishment of a Mutual Benefit Fund, for the assistance of members in sickness, old age and death ; formed upon such calculations by the most eminent actuaries, as shall combine economy of charges with absolute security.

2d.—To carry out by district meetings and a combined action any improvement that may be deemed necessary for the welfare of the trade, such as early and Sunday closing of the hours of business, or any other arrangement that may at any time be of advantage.

3d.—To watch the progress, support or oppose any legislative enactment that may affect the interests of the Chemists and Druggists as a trading community.

4th.—To enable the members of this Society to have an analysis made of any article, at a nominal fixed rate of charges, by an able trade analyst or analysts duly appointed.

5th.—To keep a registry of the transfer of businesses, of required partnerships, and situations for assistants, &c., and to be the general recipient and exponent of any trade requirement."

Judging from this outline the purposes of the new Society are mainly self-protective and benevolent, and must be viewed almost wholly as an association for promoting the business relations of its members, and protecting their "trade" from infringement.

PHARMACEUTICAL AND CHEMICAL LABELS FOR CABINETS OF SPECIMENS.—We call the attention of Professors of *Materia Medica*, of Pharmacy and of Chemistry, to the new books of labels just published by the Philadelphia College of Pharmacy. The first and larger book consists of labels for the *Materia Medica* and Pharmaceutical preparations, embracing about 1200 distinct labels, of uniform size, each label having three lines—first the Latin name of the substance ; secondly, either the botanical source, if a plant, or the chemical formula if a chemical substance ; third, the ordinary common name. They are on glazed light straw-colored paper, and arranged nearly in alphabetical order.

The second book is strictly chemical in its scope, and consists of two sizes ; the first of the more important chemical compounds—the second and smaller size, of rare inorganic and organic substances—the whole book embracing about 600 labels, and in every instance, where possible, the chemical formula of each substance is appended.

WANT OF HONESTY IN MAKING PHARMACEUTICAL PREPARATIONS.—M. L. Leroy, of New York, has sent us a piece of thick porous blotting paper, laid off in squares with a pencil ; each square contained a stain made by

a drop of some pharmaceutical liquid—each column consisted of different specimens of the same preparation, and exhibits at a glance the variation of composition by the difference in the stains. He considers this a good way to test for many of those preparations that have an ingredient that is liable to vary from its high price—as, for instance, saffron—in *Vinum Opii Crocatum*, *Elixir Proprietatis*, and *Tinctura Cinchonæ Compositæ*. The writer then remarks—

“We apothecaries are often annoyed for our charges, there being no regulations in regard to prescriptions or prices. It occurred to me the other day that a patient asked for *Vinum Opii Crocatum*, commonly called Sydenham’s Laudanum, a remedy very popular amongst the French, Italian and Spanish people, and which is made, according to every European Pharmacopœia, of

Malaga Wine,	a pound,
Powdered opium,	two ounces.
Saffron,	an ounce.
Cinnamon and cloves, of each	one drachm.

With genuine Spanish saffron at \$20 per pound, and opium at present prices, the cost of this wine is not less than \$3.50 to \$4 per pound, and for retailing we charge fifty cents per ounce, with vial. The patient exclaimed at the ‘exorbitance of the price,’ and said that he had paid but twenty-five cents for the same at another store.”

There is much truth in what our correspondent says in regard to certain preparations. It should be remembered, however, that the U. S. Pharmacopœia omits the saffron from the *Vinum Opii*, and unless the prescription specially called for *V. Opii Crocatum*, there was no impropriety in vending the other. The difficulty of applying an extemporaneous test to laudanum and other Galeical preparations, offers so great an impediment to judging of them without analysis, that Mr. Leroy’s idea of studying the subject from this new point of view seems to offer at least encouragement to try its availability. Mere color will not do for the decision in all cases, as age and light often alter the tint of genuine tinctures; but the application of re-agents to the stains produced by normal preparations may be productive, in some cases, of a valuable and easy method of recognition. For instance, the persalts of iron produce, with the meconic acid in opium, a deep red coloration. When a drop of laudanum dried on blotting paper is touched with a solution of sesquichloride of iron, a dark stain is produced; if now the same laudanum, previously diluted with an equal bulk of water, be tried, the stain caused by the iron salt has much less depth of color. How much reliance could be placed on this method in other cases it is not easy to say, yet it is worthy of trial by some pharmacist who has the time and inclination. Until, however, we have one generally recognized Pharmacopœia, it cannot be expected that uniformity in these preparations will occur, even among the reputable members of our profession.

CATALOGUE OF THE CLASS OF THE PHILADELPHIA COLLEGE OF PHARMACY.

FOR THE FORTIETH SESSION. 1860-61.

With a List of their Preceptors and Localities.

MATRICULANTS.	TOWN OR COUNTY.	STATE.	PRECEPTOR.
Abernethy, J. M.		New Jersey.	Wm. Hodgson, Jr.
Abel, Jacob W.	Philadelphia,	Pennsylvania.	W. R. Warner.
Alexander, W. F. Jr.		Virginia.	H. K. Rittenhouse.
Archibald, H. C.	Philadelphia,	Pennsylvania.	W. R. Warner.
Baratet, Prosper A.	"	"	A. Roidot.
Barr, Peter	Canton,	Ohio.	C. J. Geiger, M. D.
Bates, Daniel S.	Philadelphia,	Pennsylvania.	C. H. Needles.
Bell, Henry	Hagerstown,	Maryland.	O. S. Hubbell.
Berger, Christian	Philadelphia,	Pennsylvania.	C. Ellis & Co.
Benson, J. H.		Alabama.	
Blithe, Henry	Montgomery,	Pennsylvania.	Galliard & Marshall.
Blomer, George D.	Philadelphia,	"	Wm. M. Reily.
Bower, George C., Jr.	"	"	Geo. C. Bower.
Brown, Frederick, Jr.	"	"	F. Brown, Jr.
Buchanan, W. G.	"	"	John Moffet.
Carbonell, F. B.	Santiago,	Cuba.	
Chipman, Ed. D.	Frankford,	Pennsylvania.	Richard Warmesley.
Clothier, Wm. P.	Philadelphia,	"	Geo. J. Scattergood.
Collier, James B.	Columbus,	Georgia.	Acce & Iverson.
Craighead, George S.	Germantown.	Pennsylvania.	E. P. Tourtelot.
Cressler, Charles H.	Chambersburg,	"	J. G. Richardson.
Danner, Thomas J.	Lancaster,	"	J. S. Erben.
Dare, Charles F.	Philadelphia,	"	G. W. Vaughan.
Davis, G. H.	"	"	D. L. Weckerly.
Dickson, Robert W.	"	"	F. Brown.
Diehl, C. Lewis	Chicago,	Illinois.	J. R. Angney, M. D.
Dobbins, Edward T.	Philadelphia,	Pennsylvania.	Blair & Wyeth.
Evans, Wm. H.	"	"	F. Brown, Jr.
Everhart, Augustus	Germantown,	"	Wm. H. Squire.
Fetter, Marcus C.	Bethlehem,	"	C. H. Eggert.
Fischer, Theophilus	Philadelphia,	"	J. P. Fitter, M. D.
Gibson, Robert	"	"	W. F. Patterson, M. D.
Giffard, Wm. H.	Tuckerton,	New Jersey.	Roger Keys, M. D.
Githens, Wm. H. H.	Philadelphia,	Pennsylvania.	Wm. Procter, Jr.
Greiner, A. Weldon	"	"	Wm. Evans & Son.
Gristock, C. F.	"	"	M. P. Miller & Co.
Halpin, Wm. J.	"	"	Geo. D. Wetherill & Co.
Hambright, George M.	Lancaster,	"	Joseph C. Turnpenny & Co.
Hand, Richard T.	Cape May,	New Jersey.	Thomas Estlack, Jr.
Hansell, George	Rancocas,	"	French, Richards & Co.
Harrison, Wm. D.	Loudon,	England.	Blair & Wyeth.
Hayes, George E.	Athens.	Georgia.	R. M. Smith.
Hedges, Thomas J.	Philadelphia.	Pennsylvania.	J. N. Marks.
Heydenreich, Emile	Soultz-sous-forets	France.	Daniel S. Jones.
Higinbotham, W. Ralph		Bermuda.	Hegeman & Co., N. Y.
Hoffman, C. Ferdinand		Germany.	Bullock & Crenshaw.
Hornbeck, Molton E.	Allentown,	Pennsylvania.	E. D. Lawall.
Huff, Edmund J.	Philadelphia,	"	T. M. Perot.
Jacobs, Henry H.	"	"	Wetherill & Bro.
Jordan, C. E.	Maysville,	Alabama.	F. Jordan.
Kearney, Howard C.	Philadelphia,	Pennsylvania.	A. D. D. Taylor.
Keffer, Wm. P.	"	"	Jenks & Ogden.
Kemble, James	Penningtonville,	"	John Goodyear.
Kenworthy, James	Philadelphia,	"	James T. Shinn.

Kimball, B. W., M. D. Kunkle, S. A.	Bethel, Middletown,	Maine. Pennsylvania.	H. T. Cummings, M. D. O. S. Hubbell.
Lackey, Milford F. Lancaster, Wm. Latta, Wm. J. Letts, Charles Lloyd, Franklin Long, John C.	Heathsville, Philadelphia, " " Bordentown, Philadelphia, Lancaster,	Virginia. Pennsylvania. " " New Jersey. Pennsylvania. " "	Hassard & Co. Wm. Hodgson, Jr. C. Ellis & Co. John W. Simes & Son. Powers & Weightman T. S. Wiegand.
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Randolph, Wallace S. Reeder, Wm D. Reel, Joseph Reifsnyder, J. Henry Rex, Thomas A. Rhoads, Elam Richards, Clayton F. Richardson, Nathaniel Romberg, W. Fred. Rorer, Jonathan T.	" " " " " " Chester, Doylestown, Norristown, Haddonfield, Philadelphia, Philadelphia.	" " " " " " Delaware. Pennsylvania. " " New Jersey. Pennsylvania. Germany. Pennsylvania.	Blair & Wyeth. Wm. B. Hartman. John C. Baker & Co. J. M. Larkin. G. F. Harvey, M. D. Wm. Stahler. French, Richards & Co. Thos. J. Husband. Wm. Macpherson. Thomas P. James.
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Walker, W. T. Watson, John P. Weatherly, W. H. Webb, Robert W. Weber, Henry Wills, Clayton N. Woods, Charles	Uniontown, Middletown, Freehold, Windsor, Pottsville, Rancocas, Danville,	Alabama. Pennsylvania. New Jersey. North Carolina. Pennsylvania. New Jersey. Pennsylvania.	C. Hermansader. Wm. Taylor. E. O. Buck & Co. C. Ellis & Co. Hassard & Co. C. Ellis & Co. E. Parrish

THE
AMERICAN JOURNAL OF PHARMACY.

MARCH, 1861.

ON THE IMPORTATION OF MINERAL WATERS.

BY JOHN M. MAISCH.

In continental Europe, the practice has been prevalent for a considerable length of time of sending the water of many mineral springs abroad, put up in glass bottles or in jugs. This practice has been found remunerative, since it was imitated with the waters of several mineral springs of our country, and, among others, those from the various springs of Saratoga are probably found now in all towns of some note on the North American continent. The mineral wealth in which the Union abounds, makes it more than probable that we likewise possess springs charged with the most different saline compounds, which, when once known, would prove highly valuable auxiliaries and remedial agents in the hands of a judicious physician.

It appears to me, that this subject has been, from some cause or other, too much neglected, while, if we look at the success of the multitude of watering places in Europe, and at the enormous quantities of water bottled and sent out from them, it might well instigate all concerned to pay more attention to it here. But does the necessity exist for us as much as for Europe, where such matters usually obtain the influence of the various governments? As an answer thereto, we need but look to the importation of foreign mineral waters into this country, and we will find that the quantities brought on here from France and particularly Germany, exceed probably the expectation of all.

If we refer to the lists of importation of drugs, as published in the Druggists' Circular and compiled in several reports to the

American Pharmaceutical Association, we find that the importation of mineral waters has largely increased within the last two years. The reports of the drug importations at the port of New York, published in the Proceedings of the American Pharmaceutical Association for 1856 and 1857, contain no mineral water. During the year ending August 20th, 1858, 37 cases and 313 baskets passed through the New York Custom House; of this amount 24 baskets had been entered as Vichy, and 260 baskets as Seltzer water. In 1859, the publication of the imports had been omitted from July to October; for the remaining 8 months, ending with December 20th, the quantity of imported mineral water reached 330 casks, 684 baskets and 19 cases.

For the year 1860, we have full reports of all imported articles of the drug line, together with their cost price. Much valuable information may be derived from comparing these lists, which, if carefully compiled every year, would show our wants as satisfied from abroad, and would constitute interesting statistics of the foreign drug trade of New York, the most important port for this branch of commerce in the United States. One addition to these drug lists, it appears to me, would materially enhance their value as a source for statistical information, and would show us on what distant countries we still rely for the supply of our medicinal and similar technical articles. I refer to statements of the places from whence imported. Generally we are able to find out the countries from the value of the drugs being stated in the currency of the places of their exportation, but some uncertainty must remain; as, for instance, the currency of France, Belgium and Switzerland is francs, that of Holland, Southern Germany and the Austrian empire is guilders, &c. This uncertainty could, of course, not be overcome in the following table, which comprises the whole of the mineral water importation at the port of New York for the year ending December 20th, 1860.

During those twelve months, it consisted of 999 casks, 39 hampers, 279 cases, 3635 baskets and 2887 other packages, of the aggregate cost of \$24,618.83, by far the largest amount of which was paid to Germany, that imported from England even being probably all from German springs.

Values of Mineral waters imported at New York from

1860.	South Germany.	North Germany.	France.	England.	Other Countries.	Total.
January,						
February,	\$1460.80		\$114.07		\$50.00	\$1624.87
March,						
April,			263.34			263.34
May,						
June,	248.00		28.19			276.19
July,	2324.93					2324.93
August,	3304.86					3304.86
September,	4069.88	136.11		84.39		4290.38
October,	3835.20	136.11	29.65			4000.96
November,	1156.62		453.60	63.05		1673.27
December,	6114.46			741.57	4.00	6860.03
Total.	\$22514.75	272.22	888.85	889.01	54.00	24,618.83

Of about one-tenth only the spring was stated. From Southern Germany 1276 baskets of Seltzer water were imported at a cost of \$2915.20, averaging \$2.28 per basket, the lowest price of a basket being \$1.40, and the highest price \$4.53. Of the 39 hampers coming from England, 36 were entered likewise as Seltzer water, at \$825.96, being an average of \$22.94 cts. per hamper, the lowest price of which was \$22.47, and the highest \$28.13. Among the mineral water from France were 127 cases of Vichy water, costing \$618.60 or \$4.87 per case, of which the lowest price was \$4.53, and the highest \$7.41. The price of mineral water from "other countries" in the above table was stated in United States currency, in consequence of which no conclusion could be drawn as to its place of exportation; it comprised 50 casks at \$1 each, and 1 basket at \$4.

If we assume the price of the mineral water imported in 1858 at \$7 per case and \$3.50 per basket, which is about 50 per cent. above the average prices as stated before, the whole cost of it was \$1354.50, and the importation of mineral water has therefore increased $18\frac{1}{2}$ times in the short space of two years. These figures are undoubtedly the best proof for the increased demand, and we must remember that considerable quantities of artificial mineral waters are also manufactured in some of our large cities. I do not refer here to the carbonic acid water which is now everywhere sold under the name of mineral or soda water, but to the imitation of the water of various springs, which is likewise carried on in Europe to a large extent.

It would be interesting to obtain *reliable* information of the amount of water sent abroad from our American springs; but still it remains an important question, why we have to draw to such an extent on Europe for a supply which undoubtedly might be met from our own springs.

The true cause appears to me to lie in the fact, that our mineral waters are either not fully, or have not frequently enough been analyzed. On the continent of Europe, the analysis of mineral waters and their deposits is considered most important, and is usually repeated at different seasons and at an interval of several years, in order to ascertain whether the contents of the water vary with the season or change in the course of time. Thus it is, that of all the important springs a number of analyses are extant which allow a comparison of the varying or unchangeable qualities of the water, and confirm or strengthen the confidence reposed in its medicinal virtues.

The greatest number of such analyses are yearly made and published in Germany and France, where even periodicals are solely devoted to balneology. If the proprietors of mineral springs in America would pursue a similar course, they would undoubtedly advance their own interests, and besides stimulate scientific researches in these productions of our soil.

A large portion of the retail trade in mineral waters is in the hands of the pharmaceutists, who, for this reason, have, aside from the scientific, also a pecuniary interest in this matter, which latter would doubtless be promoted, if accurate analyses were furnished of the waters obtained directly at the springs, and probably likewise after they have been kept for some time, so that the intelligent physician might be enabled to exercise his judgment as to the particular cases, in which they will be indicated.

Philadelphia, January, 1861.

ON MEDICINAL ACONITIA AND ITS SUBSTITUTES.

BY WILLIAM PROCTER, JR.

The high price and variable quality of aconitia, has rendered its use as a medicinal agent so expensive and uncertain, that many physicians never employ it, depending upon the stronger

tinctures of the root, in cases requiring the external use of aconite. In the manufacture of organic chemical products very much is added to their cost by the complications and loss rendered necessary or unavoidable in their purification from coloring matter, or strongly adherent resinous or other inert substances in minute quantity, which, whilst their presence impairs the market value of the chemicals, often do not greatly reduce their medicinal power. In asking the attention of pharmacutists to the following modification of Headland's process for aconitia, it is with the view of furnishing them with a practicable means of supplying their own wants in regard to this potent alkaloid.

It is proper to premise that aconite root contains a green fixed oil, solid below 70° Fahr., which it is important to remove entirely from the solution, before attempting to extract the alkaloid by the agency of ether, a precaution only partially carried out in the published process of Dr. Headland. When a tincture of aconite root in alcohol of sp. gr. .835, whether prepared in the cold by percolation or by digestion at the temperature of boiling alcohol, as recommended by Headland, is evaporated to one half the weight of the root treated, a quantity of the green fatty oil above noticed, separates and floats upon the surface of the liquid. Most of this may be strained out, if the temperature is below 70° F., but a portion, together with some resin, remains intimately combined in the clear liquid, and it is this which is not removed previously to adding the ammonia, in the process of Headland. Further, aconitic acid is soluble in ether, and aconitate of ammonia may be slightly so, in which case it also would tend to contaminate the aconitia in that process.

Take of Aconite root, in fine powder, five pounds.

Alcohol, .835.

Ether,

Stronger solution of Ammonia, each a sufficient quantity.

Moisten the aconite root with two pints of alcohol, and let it stand twenty-four hours in a covered vessel, then, having packed it closely in a cylindrical percolater, pour on alcohol until three

gallons have slowly passed, or until the root is so far exhausted that the passing liquid has little, if any taste of aconite. To the tincture thus formed, add an ounce of lime, previously hydrated and in powder, and agitate them together, separate the precipitate which forms, by straining through a close cloth, and saturate the liquid with diluted sulphuric acid till slightly acid. Filter the liquid through a close filter and distil off the the alcohol, until the remaining liquid measures about a pint and a half. Remove any fixed oil which may separate on standing, and having continued the evaporation to a syrupy consistence, agitate it well with four fluid ounces of ether in a suitable bottle, and decant the ether when it has separated. Then add the solution of ammonia in excess, agitate thoroughly, wash the mixture with repeated portions of ether, by agitation and decantation, and having mixed these last ethereal liquids, allow the ether to evaporate spontaneously from a capsule, until the aconitia remains as a dry amorphous shining residue, which should be removed from the capsule, powdered and preserved for use in a stopped vial.

As thus obtained, aconitia is a powder of greenish or brownish-white color, uncrystallized, very soluble in alcohol, ether and chloroform, saturates acids, and has a strong alkaline reaction. It irritates the nose powerfully when a minute particle is inhaled, but does not excite sneezing.

Modes of using Aconitia.—When aconitia is to be employed in the form of an ointment, its activity may be much increased by adding to it a sufficiency of acetic acid to salify it, which renders it more readily absorbable in contact with the skin. The powder should first be triturated with a few drops of alcohol and the acid added to this, in the proportion of a drop of acetic acid to each grain of the alkaloid.

Glycerole.—When aconitia is mixed with a slight excess of acetic acid, it readily dissolves in glycerin, and in this state may be applied by friction to the surface requiring its anæsthetic action. The proportion of the alkaloid to each preparation, must be regulated by the prescriber; two or three grains to the drachm of prepared lard is a maximum strength for the ointment, and from this down to one grain.

SUBSTITUTES FOR ACONITIA.

Tinctura Aconiti Radicis, U. S. P.—This preparation is of such strength, that two pints of the tincture is intended to represent twelve ounces troy of aconite root. Owing to the hard and resistant structure of this root, and from the annoyance arising from the dust in effecting its pulverization, I believe this tincture to be, oftentimes, an imperfect representative of the amount of aconite used. It is suggested to those who have not a suitable mill for grinding this root, that it may be exhausted by bruising it well in a metallic mortar, with the addition of just sufficient alcohol to prevent dust arising, until fine enough for percolation. Then having added sufficient alcohol to completely saturate the powder, let it stand two days, and pack it firmly in a percolater. Pour on alcohol (which should pass slowly) until the root is nearly exhausted, (about three pints for each pound troy of the root.) Then evaporate the tincture in a water bath to two pints, and filter. This plan insures the exhaustion of the root, if due care is taken. When the aconite root can be obtained in fine powder, as through a sieve 60 meshes to the inch, it is best to proceed by direct percolation, after moistening the powder with a fourth of its weight of alcohol.

Fleming's Tincture of Aconite Root should be made with the same precaution, and in this case it is even more necessary as the proportion of root to tincture is larger.

Aconite Liniment, is the name given to a concentrated solution of aconite, with a portion of glycerin, originally prepared by the writer of this paper. (Amer. Jour. Pharm. vol. xxv. p. 293.) An experience of eight years with this preparation, warrants the opinion that it is strongly deserving of the attention of the medical profession. A fluid ounce of this preparation represents two ounces of the root; it is therefore about five times the strength of the Official Tincture, and about three times that of Fleming's tincture. I have for years past adopted the custom of keeping a normal solution of aconite root, obtained by thoroughly exhausting the drug with alcohol, and evaporating the tincture, until each fluid ounce represents two ounces of the root, removing the fixed oil that separates, and if necessary agitating it with a little diluted alcohol to remove any adherent

aconitia and extractive matter. From this the weaker preparations are made by dilution, and the stronger by evaporation, thus :

Tinctura Aconiti Radicis. U. S. P.

Take of Normal solution of aconite, three fluid ounces.

Alcohol, twelve fluid ounces.

Mix them.

Fleming's Tincture of Aconite Root.

Take of Normal solution of aconite, five fluid ounces.

Alcohol, ten fluid ounces.

Mix them.

Aconite Liniment.

Take of Normal solution of aconite, half a pint.

Glycerin, a fluid ounce.

Evaporate the solution to seven fluid ounces, add the glycerin, and mix them.

Aconite Plaster.

Take of Normal solution of aconite root, half a pint.

Adhesive plaster, a sufficient quantity.

Evaporate the solution of aconite until it assumes the consistence of thick honey, then, having weighed it, add as much adhesive plaster, previously melted, as will make the whole weigh sixteen ounces.

Extractum Aconiti Radicis.

Take of Normal solution of aconite, half a pint.

Evaporate it carefully on a water bath until reduced to the proper consistence for an extract.

In regard to the merit of this mode of proceeding, it can be said that it assures the thorough extraction of the aconite, and promotes uniformity in the strength of the preparations, and also affords a very great convenience to the dispenser, who can, by preparing a quantity of the strong solution, quickly produce the other preparations at will, in quantities to suit his requirements.

Philadelphia, Feb. 19th, 1861.

ANALYSIS OF THE CHALYBEATE WATER FROM SHARON
SPRINGS, N. Y.

BY JOHN M. MAISCH.

There are several springs of mineral water in the vicinity of Sharon Springs, which is situated 45 miles west of Albany, in the State of New York. The springs are called White Sulphur, Magnesia and Chalybeate Springs, from their most predominating contents. According to an analysis of the last named, its water contains in one gallon sulphate of magnesia, 8.56; sulphate of soda, 1.00; sulphate of lime, 16.36; sulphate of iron, 86.00; altogether, 111.92 grs. solid matter. The temperature is stated to be invariably 48° F.

I have had occasion to examine some of this water, which had been sent on to this city, from which fact I am not able to give the composition of the recent spring water. My analysis differed so much from the foregoing, that I came to the conclusion, the water must have changed through the influence of organic matter, probably of a cask, which latter supposition proved to be correct, as the spring is said to be destitute of the odor of sulphuretted hydrogen, and the water in question had been sent in an entirely new barrel. Moreover, in the demijohn I found a black precipitate, consisting of sulphide of iron, thus showing plainly that a very considerable amount of iron had been precipitated by the reaction indicated before.

This analysis cannot, for these reasons, have the same interest as if it had been performed with water drawn by me directly from the spring; nevertheless it shows the amount of alkalis and alkaline earths the water contains, and, provided the above analysis is correct, would prove that the proportion of its contents are to some extent variable.

As near as I could ascertain, the water had been drawn last fall. When I received it, it had a not very strong odor and taste of sulph-hydric acid; it possessed a slight acid reaction, and had at 60° F. a specific gravity of 1.0012.

After determining the quality of its contents, the following quantities were obtained from one gallon: sulph-hydric acid, 0.2796 grs., sulphuric acid, 44.752 grs., carbonic acid, 9.447

grs., lime, 26.2617 grs., magnesia, 8.4434 grs., sesquioxide of iron, 0.791 grs., soda, 1.6389 grs., potassa, a trace. No chlorine, arsenic or any other heavy metal besides the little iron was found.

From these results the following quantities of anhydrous salts are calculated :

Bicarbonate of magnesia,	15.1148	grains.
Sulphate of lime, . .	63.8024	"
Sulphate of magnesia, .	8.1546	"
Protosulphate of iron, .	1.4040	"
Sulphate of soda, . .	3.7401	"
Sulphate of potassa, .	trace.	
<hr/>		
Inorganic contents, . .	92.2159	"
Organic matter, . .	28.48	"
<hr/>		
	120.6959	"

By direct evaporation at 240° F., 119.26 "

Sulph-hydric acid gas, . 0.7702 cubic inches.

The estimate of organic matter is the mean of two experiments closely agreeing in result ; it was free of aprocrenic and crenic acids. After evaporation and drying the residue at 240° F. one half of the carbonic acid had been evolved, and the remainder was in combination with lime. Deducting the expelled acid and adding one equivalent of water retained by the sulphates of magnesia and iron at this temperature, the residue ought to have weighed 119.2491 grains, or .0109 grs. less than found.

The spring must contain a considerable quantity more of iron and sulphuric acid, but whether it is free of carbonic acid, cannot be deduced from my investigations, which, if no sulphuretted hydrogen had been lost by previous exposure, would on the contrary necessitate its presence. The analysis, however, shows, that the water, after its true natural constitution shall have been ascertained, may take its place probably among the best chalybeate springs of this or the European continent.

Philadelphia, January, 1861.

ON ANACAHUITE WOOD.

BY JNO. M. MAISCH.

Some time in August or September last, the New York "Criminalzeitung" published a correspondence from Berlin, Germany, which contained a statement to the effect that the Prussian consul at Tampico, Mexico, had notified his government of a wood, which is called there anacahuite, and is extensively employed with the most beneficial results in tubercular consumption. This report was considered by the government of Prussia of sufficient importance to determine on testing its efficacy in the Charité, the celebrated hospital in Berlin. The wood, it is asserted, is rare in Mexico, and the agents of Prussia have seized upon it to such an extent, that it is now difficult for others to obtain.

A subsequent correspondence of the above mentioned paper, dated Berlin, Oct. 5th, 1860, stated that the experiments with the anacahuite wood had, as yet, not led to a satisfactory result, but that they were to be continued, because it was hardly to be expected that the consul should have made such positive assertions without being satisfied of their correctness; it was added that guaiac wood, had, by some druggists in Germany, been fraudulently sold instead of anacahuite.

The "Criminalzeitung" of February 1st, publishes a paper by Dr. Krog, of New York, formerly of Berlin, which appears to be of so much interest as to warrant its translation for the American Journal of Pharmacy.

"During the summer of the past year, when the above wood was first brought to Europe, the writer has had the opportunity to observe its effects in the Berlin Charité, and to satisfy himself of the unusually favorable results. The first experiments did not prove to be so effectual as was expected, and it was supposed that a part, at least, of the alleged excellent success in Mexico must be ascribed to its climate; but subsequently it became evident that this difference was to be accounted for by the mode of preparing the wood. A simple infusion is not sufficient to extract the active principles; even heating to boiling will not entirely accomplish the object, which is attained only

by continuing the boiling for a quarter or half an hour. Such a decoction has proved very efficacious; it produced the complete resorption of the tubercles in the first stage of consumption, and afforded great relief of their distressing condition to those farther advanced. These facts suffice to make it desirable that this remedy might be extensively employed here for the benefit of the numerous patients of this class."

Such information, coming from a medical man who had witnessed the experiments, is entitled to consideration, and in view of the importance of the subject, I asked for further information, and received the following letter, which speaks for itself.

New York, Feb. 5th, 1861.

DEAR SIR:—In reply to your favor, I hasten to inform you that the anacahuite wood certainly merits the attention which it has lately received. My experience chiefly extends to its medicinal effects. At present I am unable to give the name of the mother-plant; to judge, however, from some pieces of genuine wood now before me, I am inclined to feel justified in placing it in the natural order of Papilionaceæ.

It is believed in Berlin that gratifying results have been obtained with this remedy in the first stages of phthisis pulmonalis. It is given in the form of decoction, namely \mathfrak{zvi} . to \mathfrak{xi} . of the wood to 12 to 14 oz. of water, boiled down to \mathfrak{zv} ., and this is taken 2 to 4 times daily, according to circumstances, combined with other remedies. It is requisite to continue the use of this remedy for several months, and to observe a diet in accordance with the nature of the disease.

Two weeks ago, I wrote to Berlin for the purpose of learning the latest observations with this wood, and I am ready with pleasure to communicate to you the results on their arrival.

Yours, &c.

KROG, M. D., 337 Tenth St.

It is proper, however, to state that Professor Bock, of Leipzig, opposes the use of anacahuite, insisting that in pulmonary consumption relief can *only* be found in the strictest regimen, by partaking of suitable food, breathing a pure and warm atmosphere, using moderate exercise, and attending scrupulously to a mental, intellectual, corporeal, and sexual rest.

WINE OF CITRATE OF IRON AND QUINIA.

BY SAMUEL CAMPBELL.

This preparation is ordinarily prepared by dissolving the salt in "pure Sherry wine," with the aid of heat, the strength varying from 2 to 5 grains in each teaspoonful.

From the fact of my having met with a dissimilarity in the commercial salt, in appearance, taste and solubility, I would propose the following formula, as being an eligible and a reliable one for extemporaneous prescription, hoping that it will prove acceptable to the profession in general.

R. Quiniæ Sulphatis,	grains 140
Acidi Citrici	" 120
Ferri Citratis	" 600
Acidi Sulphurici diluti	f. ʒiii.
Aquæ Ammoniaë	
" Destillatæ aa. q. s.	

Rub the quinia salt until perfectly miscible with four ounces of distilled water, then add the diluted acid to form a clear solution, pour it into a decanting vessel, and add gradually the solution of ammonia until it ceases to form a precipitate, being careful not to have the alkaline solution in too great an excess. The precipitate is to be carefully washed with distilled water until the washings cease to evince any further evidence of an alkaline reaction upon a piece of litmus paper previously reddened with an acid. The hydrated quinia is then incorporated with the citric acid and citrate of iron previously dissolved in three ounces of boiling distilled water. When completely dissolved, add sufficient distilled water to make the whole measure thirteen fluid ounces. Each fluid drachm of this solution contains eight grains of the double salt. In order to prepare the wine of the citrate of iron and quinia, it may be readily done by mixing two fluid drachms of the above solution with six fluid drachms of pure Sherry wine; so that each teaspoonful will contain two grains of the salt, or the strength can be varied to meet the wants of the physician.

January 19th, 1861.

GLEANINGS FROM GERMAN JOURNALS.

By J. M. MAISCH.

Reaction of strychnia.—The solid strychnia when mixed with solid iodic acid or iodate of potassa and a drop of strong sulphuric acid, assumes, according to X. Landerer, on the application of a gentle heat, a beautiful violet color, gradually changing to red brown, remaining unchanged for many days. The thick liquid shows after a few hours a beautiful iridescence continuing for several days.—(Hirzel's Zeitschrift, xii. 86.)

Oleum cadinum is the empyreumatic oil of *Juniperus oxycedrus*, a shrub of Greece, the reddish berry-like fruits of which are of the size of gooseberries, and were formerly exported to England; the wood is odorous, and not subject to decay or the attack of insects. The empyreumatic oil is a popular remedy for chronic eruptions of the skin, psoriasis, herpes, &c., and is employed with an equal part of glycerin made into paste by starch. The fresh plant and particularly the fruit are used for making the oil. Similar is the

Empyreumatic grain oil, called sitoladon, which is prepared from wheat and other grain, by throwing it in red hot iron pans, and inverting an earthen pot over them to condense the oily vapors.—(Landerer in Hirzel's Zeitschr. xii. 89.)

Estimation of silver in the metallic state.—Fellenberg proposes to dissolve the choride of silver in ammonia, dilute with water, precipitate by a strip of bright copper, collect and wash the silver upon a filter, incinerate and fuse with borax; or to incinerate the filter containing the chloride, without fusing the latter, and reduce it by means of pure lead upon bone ashes. These processes avoid the tedious drying of the filter and the precipitates.—(Schweiz. Zeitschr. v. 121, 122.)

Ferri protochloridum is obtained pure, according to E. Amsler, by evaporating the recent solution almost to dryness, and adding powdered iron and strong muriatic acid in the proportion of 1 part of the former to 5 of the latter; the mixture is then evaporated to dryness with continued stirring by an iron spatula. The nascent hydrogen evolved will effectually reduce

all the sesqui- to the protochloride and the dry salt will keep for a considerable time. The proposed

Tinctura ferri protochloridi he advises to preserve by sugar, $\frac{1}{2}$ ounce to 1 oz. of the salt and 7 oz. of alcohol of 60 per ct. (Schweiz. Zeitschr. v. 123, 124.)

Use of glycerin.—Gros-Renaud states that glycerin of 1.200 spec. grav. dissolves between 177 and 187° F. much aniline-violet, the so-called aniline or indisine; between 133° and 144° F., whether diluted with water or not, it readily dissolves gum arabic, and the solution remains unchanged for a long time; albumen is taken up in all proportions by glycerin, diluted with an equal measure of water, between 90 and 100° F., and thus preserved for considerable time without undergoing putrefaction. (Polytechn. Centralhalle—Schweiz. Zeitschr. v. 127.)

Detection of nitric acid.—Stein proposes to heat the salt with pure protoxide of lead in a long test tube, into the orifice of which a strip of filtering paper, previously dipped into an acid solution of protosulphate of iron, has been inserted; the paper must not become too hot. A yellowish to brown color will be observed from a mixture of 1 p. saltpetre with 1000 p. glauber salt. The presence of chlorides and binoxide of lead must be avoided. (Pharmac. Centralhalle—Schw. Zeitschr. v. 128.)

Preparation of antimoniate of potassa.—A. Reynoso prepares it by adding the solution of a salt of antimony to sufficient caustic potassa to retain the oxide in solution, which is then oxidized by the addition of permanganate of potassa, until the liquid begins to remain colored; a few drops of the alkaline solution of antimony will remove the color, and, by evaporation and cooling, crystals of antimoniate of potassa are soon obtained.—(Polyt. Notizblatt.—Schw. Zeitschr. v. 131.)

Nitric acid stains may be easily removed from the skin by sulphide of ammonium containing caustic potassa, scraping the colored portion off, and washing with water and very diluted sulphuric acid. Deadened skin, like callus, &c., may be removed in a similar manner; the hands become perfectly clean and smooth. (Pharm. Zeit. v. Bunzlau.—Schw. Zeitschr. v. 132.)

Corydalia has again been investigated by G. Leube, jun. He has likewise been unable to obtain crystallizable compounds with acids, found Müller's ultimate analysis correct, and proved the alkaloid to be anhydrous when dried at 50° C. (132° F.) The equivalent weight was calculated from the yellow precipitate with bichloride of platinum = 4720 ($O = 100$) and from the white precipitate with bichloride of mercury = 4672.

Its formula is $C_{46}H_{29}NO_7$, the equivalent weight 4687.5. (Wittst. V. Schr. ix. 524—527.)

Phospho-molybdate of ammonia.—E. Spiess, of Munich, and Professor V. Eggertz, of Fahlun, corroborate Nuntzinger's analysis of this compound, who calculated after drying at 212° F. the following formula: $4(H_4NO, 10MoO_3) + (H_4NO + [8MoO_3, 2PO_5]) = 3.577 NH_4O, 3.962 PO_5, 92.461 MoO_3$.—(Wittst. V. Schrift ix. 527—429.)

Fat in urine was observed by Landerer in the urine of a young man suffering from tuberculosis; it had an acid reaction. (Wittst. V. Schr. ix. 534.)

On emery.—The trade in emery is not, as formerly, monopolized by the Greek government, which now levies a tax of 5 drachms per hundred weight when exported. Other hard minerals are sometimes fraudulently substituted for it, to detect which, and to determine the value of the emery, the following method is employed in Smyrna: A plate of glass of known weight is rubbed with a certain quantity of the emery until it has no further effect; the lighter the glass has become, the better is the quality of the emery. The emery diggings of the government are on the island of Naxos. A ferruginous clay silicate has lately been discovered upon the island of Skyno, which is not inferior in hardness to emery.—(Wittst. V. Schr. ix. 535).

Estimation of nitric acid.—Fresenius dissolved a known weight of fine piano-wire in an excess of muriatic acid, contained in a retort through which hydrogen passes; the nitrate is afterwards thrown in, and after the dark color has disappeared, the amount of protoxide in the cooled solution is determined by permanganate of potassa. The quantity of peroxide is now easily calculated, and from it the amount of nitric acid by which

it had been peroxidized. (Ann. d. Chem. und Pharm. xxx. 217—219.)

The Cinchona barks of New Granada, the yellow bark of *Cinchona lancifolia*, Müt., and a green Loxa bark of *C. corymbosa*, Karst., have been studied by Dr. Karsten during his residence there. The amount of alkalies varies much, and appears to be dependant on the climate rather than on the soil. The average yield of the bark of *C. lancifolia* is $2\frac{1}{2}$ per cent. sulphate of quinia and 1 to $1\frac{1}{2}$ sulphate of cinchonina; it frequently contains no organic base, or only cinchonina, or quinia in small proportion, or it yields occasionally $4\frac{1}{2}$ per cent. of sulphate of quinia. The bark of the young branches of a tree of this species contained not a trace of organic alkaloids, while the bark of its stem yielded $1\frac{1}{4}$ per cent. sulphate of quinia and $\frac{1}{4}$ sulphate of cinchonina. Quinia appears to be a product of secretion, and to be resorbed again by the process of vegetation; a bark after the felling of a tree, yielded $3\frac{1}{2}$ per cent. sulphate of quinia, after 6 months only 3 per cent., and during this time the bark had retained its freshness on the tree. A continued uniform climate, changing with fogs, sunshine and rain, is the condition for a larger proportion of alkaloids, while a changeable climate with intermitting vegetation produces a poorer bark. (Ber. d. Berl. Akad.—Arch. d. Ph. cli. 52.)

Organic hyperoxides have been prepared by C. Brodie. Peroxide of benzoyle = $C_{14}H_5O_4$ is the result of the reaction between chloride of benzoyle and peroxide of barium, crystallizes from ether, and is decomposed above the boiling point of water with detonation, and by potassa into oxygen and benzoic acid.

Peroxide of acetylene = $C_4H_3O_4$ is yielded by anhydrous acetic acid and peroxide of barium in absolute ether; it is a tough liquid of pungent taste, decolorizes solution of indigo, oxidizes instantly protoxide of manganium, yields with baryta water peroxide of barium and acetate of baryta, and detonates violently when a drop is heated upon a watch crystal, shattering the glass to atoms. (Ann. d. Ch. und Ph. xxxii. 79—83.)

Acetic acid by dry distillation of American turpentine was obtained by C. Grimm. During the first period a distillate is

obtained consisting of oil of turpentine and a layer of "turpentine water," which is colorless, light yellow to brownish red, boils between 110 and 120° C. (230 and 248° F.) and contains acetic acid. (Annal. d. Chem. und Ph. xxxi. 255, 256.)

Anhydrous oxalic acid = $C_2H_2O_4$ is according to Erdmann obtained at ordinary temperature over sulphuric acid; it is proposed by him for preparing the normal acid of volumetric analysis.—(Journ. f. prakt. Chem. lxxv. 4, 5.)

Preparation of an ethereal solution of binoxide of hydrogen.—This has been recommended by Dr. H. Storer as a test for chromic acid. Professor R. Böttger proposes the following method for preparing a solution which will keep unaltered for a long time: A piece of sodium of the size of a hazelnut, and freed from petroleum, is heated in a rather flat somewhat inclined porcelain capsule over a Bunsen gas burner to fusion, so that it ignites when stirred in contact with the air by means of an iron rod. As soon as the burning and glowing ceases, it is transferred to a well-stoppered vial. Of this impure binoxide of sodium, small particles are carried into about an ounce of very dilute sulphuric acid (1 to 24 water) contained in a narrow cylinder which is kept cool. After the third or fourth introduction, ether is added, the liquids agitated, and after separation the ether removed; this may be continued until the ethereal solution ceases to produce an intensely blue color with a diluted solution of chromic acid. With little material, a considerable quantity of this new reagent is produced in a short time. (Wittst. V. Schr. ix. 546.)

Estimation of arsenic.—A solution of pentasulphide of arsenic (AsS_5) in sulphide of ammonium yields instantly a precipitate of ammonio-arsenate of magnesia by a solution of magnesia. Lenssen states that the sulphides of tin and of antimony are not precipitated under the same conditions. (Ann. d. Chem. und Ph. —Wittst. V. Schr. ix. 574.)

Separation of phosphoric acid from sesquioxide of iron and alumina.—W. Mayer states that the requisite proportions to effect this separation, are for 1000 cub. cent. 15 grm. (1 equiv.)

tartaric acid, 6 grm. (1 equiv.) anhydrous sulphate of magnesia, and 16.5 grm. (3 equiv.) of chloride of ammonium. With other proportions, ammonia produces a precipitate containing besides ammonio-phosphate of magnesia, also basic tartrate of magnesia.—(Ann. d. Ch. und Ph. xxv. 164.)

Silicon in iron.—The black residue left after dissolving crude iron in muriatic acid, was found by Schafhäütl to evolve hydrogen with ammonia. Woehler has proved it to contain oxide of silicon.—(Ann. d. Chem. und Ph. xxviii. 374.)

Veratric acid = $C_{15}H_{10}O_8$, according to W. Merck, yields with strong nitric acid yellow nitro-veratric acid $C_{10}H_9NO_{12}$, which is soluble in water, crystallizes from alcohol and yields binitroveratric acid with more NO_5 . By heating moderately with 3 parts of baryta, veratrol = $C_{16}H_{10}O_4$ is obtained, which has an aromatic odor, crystallizes at 15° (59° F.), possesses the spec. grav. of 1.086, boils between 202 and 205° (396 to 401° F.); it yields with fuming nitric acid nitro- and binitroveratrol, and with bromine bibromoveratrol = $C_{16}H_8Br_2O_4$ —(Annal. d. Ch. und Ph. xxxii. 58—62.)

Panis laxans, or laxative cake, is prepared by painting the underside of small biscuits with an alcoholic solution of jalap-resin, and covering the place with a thin layer of a mixture consisting of beaten albumen, sugar and a little tragacanth; each cake to contain 2 gr. of resin. The dose as a mild laxative is 2 or 3 cakes for a grown person, 1 for a child from 6 to 8 years, &c.—(Pharmac. Centralhalle i. No. 12.)

Tin in vinegar.—Investigations caused by the State authorities in Potsdam have developed the fact, that pure vinegar carried in bright tin measures from the cellar to the store contained a small quantity of tin, which increased on standing and was considerable after boiling. Tin measures may probably be frequently the cause of the deleterious effects of vinegar, looked for in other circumstances.—(Arch. d. Med. Ges.—Arch. d. Pharm. cli. 115.)

Suppositories.—Dr. Pfeiffer prepares them as follows: cacao-butter or suet is fused with $\frac{1}{8}$ white wax and moulded. Im-

mediately before hardening, a tube is pressed through the base towards the middle, producing a channel which is to be filled with the medicinal substances desired, after which the aperture is closed by butter of cacao. Thus they become more active, and may be kept all ready except the filling.—(Arch. d. Pharm. cli. from Journ. des Connaiss. Méd. et Ph.

Creasotum chloroformatum.—The following or a similar mixture has long been in use in France: Creasote 1 p., chloroform and alcohol of each 2 p., by weight. (Ph. Centralhalle i. 1.)

Aqua St. Johannis.—The following mixture is employed in Southern France as a vulnerary, diminishing suppuration, and being useful in all cases where spirit of camphor and lead water is indicated: sulphate of zinc ʒj., sulphate of copper ʒj., water ʒxxxvj., dissolve and add tincture of saffron ʒij., spirit of camphor ʒij., (Pharm. Cent. Halle i. No. 6.)

Glycerine in incipient dysentery is employed by Dr. Daude in the form of clysters, each composed of glycerine ʒiv. and mucilage of linseed ʒxx. At the same time, of the following mixture a tablespoonful is given every hour: glycerin ʒjss. water and orange flower water each ʒiv. (Ph. C. H. I. No. 6.)

Pomata contra varos.—Pomade for pimples, &c. Washed sulphur, tannin, concentrated bitter almond water, each 5 parts; oil of thyme, oil of bergamot, each 1 p., lard 60 p. (Ph. C. Halle i. No. 1.)

REMARKS ON THE LAW OF PENNSYLVANIA, REGULATING THE SALE OF POISONS, INCLUDING LEGAL COMMENTS ON THE STATUTE, BY A LAWYER.

BY CHARLES BULLOCK.

To the Editor of the American Journal of Pharmacy:—

Most druggists in our State are aware of the existence of a recent statute regulating the sale of poisons. We doubt, however, if many have carefully read the Act, or considered its bearing on their every day business.

For a better understanding of the subject, we have been kindly furnished with a copy of the Law, and some remarks on its judicial interpretation, by a member of the Philadelphia bar, and a former graduate of the Philadelphia College of Pharmacy.

The Act of Assembly in regard to the Selling of Poisons, &c., passed the 31st day of March, 1860.

[See Pamphlet Laws, 1860, page 401, §70. Also Purdon's Digest, page 1351.]

"SEC. 70.—No apothecary, druggist or other person, shall sell or dispose of, by retail, any morphia, strychnia, arsenic, prussic acid or corrosive sublimate, except upon the prescription of a physician, or on the personal application of some respectable inhabitant of full age, of the town or place in which such sale shall be made; and in all cases of such sale, the word poison shall be carefully and legibly marked or placed upon the label, package, bottle, or other vessel or thing in which such poison is contained; and when sold or disposed of, otherwise than under the prescription of a physician, the apothecary, druggist or other person selling or disposing of the same, shall note in a register, kept for that purpose, the name and residence of the person to whom such sale was made, the quantity sold, and the date of such sale; any person offending, shall be guilty of a misdemeanor, and, on conviction, be sentenced to pay a fine not exceeding fifty dollars."

Dear Sir,—In obedience to your request, I furnish you above with a copy of the section of the new criminal code, relating to the sale of poisons, &c. The report on the code says: "Its object is to prevent mistakes in the sale of noxious drugs; to throw impediments in the way of malicious and wicked persons obtaining them for murderous purposes, and to facilitate the detection of such persons, when their malignant purpose has been accomplished. The instances of murder, by poison, have recently increased to a frightful extent, both in Europe and in this country, and such legislation is demanded for the suppression of this crime." Whether this law will accomplish the objects pointed out in this report on the code, or whether the passage of any Law on the subject is beneficial, does not come within your question. As to the terms and requirements of the law and the proper method of obeying its command,—

What are these?

First. A prohibition of the sale of specified poisons, except in certain cases expressly pointed out by the law itself.

Second. The manner of marking or labeling the article containing such poison.

Third. A registration of the sale, &c.

Fourth. The grade of the offence for violating the provisions of the Act and the penalty for so doing.

I will take up the divisions of the Act in their order.

First. "*Morphia, strychnia, arsenic, prussic acid, or corrosive sublimate,*" are the only poisons named in the Act; but probably a judicial decision,

following the analogy of judicial interpretation, would include under those generic terms all the compounds into which those substances enter imparting their poisonous properties, limiting it to those only which could be used for the destruction of human life, which is the sole object the legislature proposes to prevent. To be within the Act, the sale of the forbidden poison must be by retail, that is, in small quantities, to a party standing in the position of a consumer and not a seller or manufacturer, and it matters not whether they be given or sold to improper parties, for both acts seem to be within the statute; the object of the Legislature is to prevent the poison from passing into the hands of improper parties, and not merely to prohibit a sale.

The sale or disposal by retail (small quantities to consumers) of the poisons named in the Act is absolutely prohibited, "*except upon the prescription of a physician, or on the personal application of some respectable inhabitant of full age, of the town or place in which such sale shall take place.*" To avoid the penalty of the statute, the sale must be bona fide upon the *prescription* of a physician, and I apprehend the dispenser of the poison is bound to know that it is a prescription of a physician, as it purports on its face to be, and that a mere order in the technical form of a prescription would not shield him from the penalty. In the latter part of the proviso, the sale may be "*upon personal application of some respectable inhabitant of full age, &c.*" But the application must be personal and not by order or agent, and the seller must know that the purchaser is such an "*inhabitant,*" and "*of the town or place in which such sale shall be made,*" for a sale to a stranger is not contemplated by the statute, nor is any provision made for it, and such sale would incur a penalty. The Act contemplates that the purchaser *shall be known* to the seller, that he shall be of *full age*, of the *town or place where the selling* takes place, and that his position and character shall be a sufficient guaranty to the seller that no improper or criminal use shall be made with the poison.

The second provision of the Act directs that "*in all cases of such sale the word poison shall be carefully and legibly marked or placed upon the label, package, bottle or other vessel or thing in which such poison is contained.*" The third provision of the Act directs, that where the poison is "*sold or disposed of otherwise than under the prescription of a physician,*" the dispenser "*shall note in a register kept for that purpose the name and residence of the person to whom such sale was made, the quantity sold and the date of such sale.*" Singularly enough he is not directly required to enter the name of the kind of poison, only the name and residence of the purchaser and the quantity and date, but the name of the kind of poison is implied from the very object for which such entry is directed to be made, to wit, to facilitate the detection of those persons who have used the poison for murderous purposes, and the entry in the register would not comply with the spirit of the law if the name of the poison should be left out. To comply with this portion of the Act, the dispenser must obtain and keep

a book solely for the purpose of making and keeping the registry as required by the act, (a memorandum would not be proper), and the dispenser must note therein the name and residence of the party receiving the poison, the kind of poison sold, the quantity thereof, and the date of such sale,—and for the safety of the seller, such entry should be made at the time of such sale, and he should see that the entry is true and accurate in all its particulars, for he is the party directed by the Act to make such entry, and upon him alone falls the punishment if the entry comes not up to the requirements of the statute; for from that book and upon the entries therein made may, perhaps, the purchase and possession of poison be traced to one charged with a criminal use of the poison; thus the register is to be made a part of the detective system of our police.

The fourth and last provision of the Act makes the violation of any of the requirements of the statute an offence of the grade of a misdemeanor, and expressly provides a punishment, to wit, a fine not to exceed fifty dollars for violating the Act, either in disobeying the prohibition or for not complying with its requirements in regard to the sale of the poisons; which would be carried into effect by an indictment for the offence and a conviction in the Court of Quarter Sessions of the County where the offence was committed; and such conviction would subject the party defendant to to the payment of all costs in addition to the fine directed by the Act. Whether a civil suit could be maintained by a party injured, for damages resulting from the wrongful sale or disposal of the poisons named in the Act, does not come within the scope of your inquiry.

Yours respectfully,

C. T. BONSALL.

Whether judicial restraint on the sale of poisons, in the shape of a law such as the present, will promote the object most to be desired, viz: Security against the malicious or careless use of poisons, is a question which has engaged the attention of our own as well as the medical profession.

The several Colleges of Pharmacy and the American Pharmaceutical Association have labored with the subject for years, with the laudable desire to afford some protection to the public against the indiscriminate sale of noxious drugs and chemicals. As yet they have not felt prepared to recommend a law of the kind enacted by our Legislature, as affording the security to be desired.

So long as the sale of such articles is left open to free competition, without any restraint as to the qualification and character of the druggist, the law will by many be regarded as an impediment to trade, and fall short of protecting the community

from the more numerous cases of poisoning which result from accident and carelessness.

A law on the subject should be one to which every conscientious druggist and chemist can give his support, without finding it necessary to infringe either its spirit or letter.

Can he do so with the present law? We are informed that the dispensing druggist must know that a prescription calling for Solution of Morphia, Fowler's Solution, &c., is written by a graduate of some incorporated medical school; the usual form, carrying with it all the usually accepted guarantee of a physician's prescription, is, we are told, not sufficient; the dispenser must be able to identify the writing of the prescriber so certainly as to be willing to risk the consequences of a misplaced judgment.

Again—what constitutes the standard of *respectability*? The law does not require the applicant to be *personally known*, only *respectable*, of full age, and a resident of the place where the sale is made. On this *questionable* security the dispenser is allowed to dispose of noxious articles, while he is forbidden to supply the same to the chemical department of a school or college on the *written order* of a well known and responsible teacher or professor.

As the law does not define the meaning of *retail*, to which department it limits its restrictions, the seller must use his judgment; if he *wholesales* poisons to *even improper persons*, he is guiltless of violating the letter of the law.

The requirements regarding labeling and registration are salutary, and have been customary in well regulated stores.

The act seems directed chiefly to the sale of poisons for criminal purposes, and we wonder why many potent and deleterious substances, now common, should have escaped notice.

The best protection to the community against the indiscriminate sale of poisons, is the *character* and *judgment* of the dispenser. So long as any one who places a bottle of colored water in his window, and a sign over his door, is considered a responsible judge of *respectability*, and the difference between *retail* and *wholesale*, we will have arsenic and corrosive sublimate sold to any one who has money to pay for it.

Philada. Feb. 20, 1861.

CHARLES BULLOCK.

ON THE PREPARATION OF CITRATE OF MAGNESIA.

BY WILLIAM J. WATSON.

Editor of the American Journal of Pharmacy :

DEAR SIR,—In the preparation of Citrate of Magnesia by the formula of the Pharmacopœia, I have always failed to obtain a permanent solution ; and all the druggists whom I have consulted give the same report.

The following formula, which I have adopted and by which I have prepared the citrate for about two years, gives a preparation which, though not so active as the solution of the Pharmacopœia, acts thoroughly as a purgative when the contents of a bottle are taken fasting, is pleasantly acid, contains a large quantity of carbonic acid gas, and does not produce griping, as the solution containing Bicarbonate of Potassæ is said to do ; and will, if tightly corked, remain without change or deposit for an indefinite time.

Acid Citric,
 Magnesia Carb. (The form known as small squares.)
 Syr. Simplex,
 Ol. Limonis,
 Aqua, *aa* q. s.

Take six twelve ounce citrate bottles, (to each of which has been fitted a good velvet cork, previously macerated in boiling water for half an hour), add to each bottle Ol. Limonis gtt.j, Syr. Simplex \mathfrak{z} iss.; weigh out six separate portions of Acid Citric, \mathfrak{z} iv. each, six of Magnesia Carb., \mathfrak{z} ij. each, and six of Acid Citric, \mathfrak{z} ij. each ; put into a mortar one of the portions of Magnesia Carb. and one of the \mathfrak{z} iv. portions of Acid Citric, rub together with sufficient water (about six ounces) to make a smooth mixture, and add to one of the bottles, proceed in the same manner with the remainder ; (commencing with the first bottle to which the solution was added,) add one of the \mathfrak{z} ij. portions of Citric Acid to each, fill up with Aqua, cork and tie down, place the bottle on its side for half an hour, shaking occasionally.

By this process the solution of Citrate of Magnesia is not filtered, and to insure a handsome preparation the water should

be perfectly clear, and the Magnesia and Citric Acid free from all insoluble matter.

I hope that the publication of this formula will prove of service to those who have heretofore been disappointed in the preparation of this article.

Very respectfully,

WILLIAM J. WATSON.

Brooklyn, N. Y., Feb. 18, 1861.

ON THE ALKALOID AND OTHER CONSTITUENTS OF COCA LEAVES.

BY DR. ALBERT NIEMANN, of Goslar.

The inaugural dissertation of the author is published in Wittstein's V. Schrift. ix. 489-524; it contains many interesting facts, but is too lengthy for translation; we therefore give in the following a condensed account of it.

After discussing the importance of the vegetable alkaloids in a medicinal point of view, and for the examination of crude drugs, the author disapproves of such incomplete investigations as enrich our knowledge with nothing else but names, and then considers the interest attached to those stimulating vegetables, denominated by von Bibra, "narcotic victuals," like coffee, tea, cacao and tobacco; the coca leaves are employed for similar purposes by the natives of Peru and Bolivia.

The Austrian frigate Novara brought from Lima a quantity of good coca leaves, which Professor Woehler handed to the author for investigation.

After treating at length of the botanical characteristics of the order Erythroxylaceæ, which comprises only the genus Erythroxylon, and its geographical extension, he gives a minute description of *E. coca*, its culture and the use and properties of its leaves, referring to the observations and opinions of von Martius, Poeppig, von Tschudi, Weddell and Scherzer, some of whom have advocated the introduction of the coca into the European navies and armies on account of its well known qualities to preserve life and strength for a considerable time without food.

The author reviews the various incomplete investigations of

Wackenroder, Johnston, Gaedcke, and MacLagan, and states that the alkaloid prepared by Pizzi of La Paz, and brought by Tschudi to Europe, was analyzed by him and found to be gypsum.

The following is the author's process for preparing the alkaloid which he proposes to name *cocaina*. The leaves are exhausted with 85 per ct. alcohol containing $\frac{1}{50}$ sulphuric acid, the tincture treated with milk of lime, the filtrate neutralized with sulphuric acid, and the alcohol regained from the filtrate by distillation. The syrupy residue is treated with water to separate resin, the liquid is precipitated by carbonate of soda, when an odor reminding of nicotia is emitted, and the alkaloid is exhausted by repeated agitation with ether, distilling off most of the ether, and evaporating the balance spontaneously. The yield is about $\frac{1}{4}$ per ct. of crude *cocaina*, consisting of colorless crystals mechanically mixed with a yellowish brown matter of a disagreeable almost narcotic odor, which cannot be removed by animal charcoal or recrystallization, but may be separated by washing with cold alcohol. Less loss is sustained if the ethereal solution is agitated with diluted sulphuric acid, the aqueous solution of the sulphate precipitated by carbonate of soda and the precipitate freed from the last traces of coloring matter by alcohol. The alkaloid crystallizes best on evaporating spontaneously an alcoholic solution previously diluted with water.

Pure *cocaina* is in colorless transparent, rather large prisms, inodorous, soluble in 704 parts water at 12° C. (53.6° F.), more in alcohol, freely in ether. The solutions have an alkaline reaction, a bitterish taste, promote the flow of the saliva, and leave upon the tongue a peculiar numbness, followed by a sensation of cold. The crystals fuse at 98° C. (208° F.) and congeal again to a transparent mass, which gradually assumes a crystalline structure. Heated above its fusing point, it becomes colored, and is decomposed; it runs up the sides of the vessel, and it is uncertain yet whether a small portion will sublime unaltered. It fuses upon platinum foil, and burns with a bright flame, leaving a charcoal, burning with some difficulty.

No physiological experiments have as yet been made with it.

The alkaloid is readily soluble in all diluted acids, forming salts which are of a more intensely bitter taste than uncombined *cocaina*. It absorbs dry hydrochloric acid gas, fuses and congeals

to a greyish white transparent mass which crystallizes after some days; the solution crystallizes in long, tender, radiating crystals. The sulphate and nitrate dry to an amorphous colorless mass, which gradually changes to crystals, the latter with great difficulty. The acetate readily assumes the form of a crystalline, sometimes herbaceous, looking mass.

The following is the behaviour of a diluted solution of the hydrochlorate to reagents:

Fixed alkalies: a white precipitate, slowly soluble in a large excess.

Ammonia and carbonate of ammonia: the same precipitate, readily soluble in excess.

Carbonate of soda: white precipitate, insoluble in excess, becoming crystalline.

Sulphocyanide of potassium: a slight turbidity.

Protochloride of tin: a white curdy precipitate, soluble in much nitric acid.

Nitropicric acid: a pulverulent sulphur-yellow precipitate, becoming resinous.

Tetrachloride of gold, even in the most diluted solutions: a voluminous light yellow precipitate, becoming flocculent, soluble in the heated mother-liquor and crystallizing on cooling in beautiful yellow scales, resembling iodoform; it crystallizes from hot alcohol in golden yellow scales or in a dense granular powder.

Bichloride of platinum: a dirty greyish yellow precipitate, becoming crystalline, soluble on heating, scarcely soluble in muriatic acid.

Tannin: a very slight turbidity; in the presence of muriatic acid a voluminous pearly white precipitate, shrinking and becoming resinous in appearance.

Bichloride of mercury: a voluminous, soon flocculent precipitate, soluble in muriatic acid and in chloride of ammonia. It does not crystallize from its solution in alcohol.

Iodo-hydrargyrate of potassium: a curdy white precipitate, soluble in muriatic acid and chloride of ammonium.

Molybdate of ammonia in the most dilute solutions: a voluminous yellowish white precipitate.

Iodine: a kermes brown precipitate.

Iodide of potassium: scarcely a faint turbidity; when con-

taining iodine a strong brownish red precipitate, which darkens gradually.

Tincture of iodine, no turbidity in the alcoholic solution of cocaina. No reactions were obtained with phosphate of soda, bicarbonate of potassa, tartar emetic, acetate and subacetate of lead, sesquichloride of iron, and iodic acid.

Cocaina is dissolved by fuming nitric and by concentrated nitric, hydrochloric and sulphuric acids without coloration; when heated, only the latter darkens and ultimately blackens it. A characteristic test with oxidizing agents has not been observed. In its chemical and also physical properties, it resembles atropia to some extent.

The atomic weight of the alkaloid was determined from the double salt with chloride of gold, and was found from the amorphous compound = 283, crystallized from hot water = 280, crystallized from alcohol = 288. On heating the dry double salt, a sublimation of benzoic acid took place, the first observation of the kind of any known alkaloid. Ultimate analysis showed the following composition :

Calculation.				
C 66.8	66.8	C 32	192	66.20
H 7.1	7.5	H 20	20	6.90
N 5.4	5.4	N	14	4.83
O 20.7	20.3	O 8	64	22.07
<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
100.0	100.0	C ₃₂ H ₂₀ NO ₈	290	100.00

Vegetable wax from coca leaves. The precipitate occasioned by milk of lime in the alcoholic tincture was treated with cold ether, which on evaporation left a soft sticky brown mass, wholly soluble in boiling alcohol, from which, on cooling, a white body was separated, appearing after repeated solution in hot alcohol as a snow-white granular mass. It fuses at 70° C. (167° F.), is slowly soluble in hot alcohol, readily in ether, and is not acted on by solutions of alkalis or acids. By elementary analysis 80.2 C., 13.4 H. and 6.4 O. were obtained, which leads to the empirical formula, C₆₆H₆₆O₄. The composition of this body, called coca wax by the author, closely corresponds with that of Mulder's grass wax and syringa wax.

Coccatannic acid. After precipitating the cocaina by carbonate of soda as above, the dark red filtrate is freed from ether, neutralized by nitric acid, the sulphuric acid removed by nitrate of baryta, the excess of the latter by carbonate of ammonia, and the liquid neutralized by nitric acid; acetate of lead now produced a voluminous dirty brownish green precipitate, which was decomposed by sulphuretted hydrogen, and yielded a clear yellowish red solution of slightly astringent taste, reddening litmus and giving the following reactions: Alkalies and their carbonates, a deep red color; sesquichloride of iron, a dark brownish yellow color; glue and bichloride of mercury, no turbidity; the nitrates of mercury, dirty yellow precipitates, soluble in acids; tartar emetic, a flocculent, brownish yellow precipitate; albumen, dirty yellow; acetate of baryta and lead, dirty yellow, soluble in acetic acid; terchloride of gold, dark brown precipitate, soon after a mirror of metallic gold; nitrate of silver, a turbidity, on heating a dirty yellow precipitate, afterwards a dark brown powder; hydrochlorate of cocaina, no turbidity. The tannin solution reduced chromate of potassa, and on boiling, also, Fehling's solution of copper; it dried on evaporation to a transparent brownish red mass, containing some inorganic matter.

The filtrate from the precipitate with acetate of lead, yielded with subacetate of lead a yolk yellow precipitate, apparently containing the same tannin partly modified through the influence of the nitric acid.

Odorous principle. On distilling 100 grm. of the leaves, a slightly turbid distillate was obtained, which, on redistilling it with chloride of sodium, yielded white globular masses, lighter than water and possessing the peculiar tea-like strong odor of the leaves; the quantity was insufficient for further analysis.

J. M. M.

ON THE DETECTION OF PHOSPHORUS IN CASES OF POISONING.

By DR. C. HERZOG.

The author has made experiments with the various methods suggested, and refers particularly to Mitscherlich's process and some slight modifications of it; he then continues: But if thus no phosphorus could be discovered in a corpse, the possibility of poisoning by it is not excluded; we can imagine that it may have

remained long enough in the body before death occurred, to become oxidized into phosphorous acid; this may even be possible in a corpse which has been interred for some time.

The substance is, if necessary, rendered sufficiently liquid with water, and without the addition of an acid is distilled from a flask connected with Mitscherlich's apparatus. The most minute quantity of free phosphorus will evidence itself by the peculiar vapors and the characteristic lumination in the dark. If this is not observed, and there exists the suspicion of poisoning by phosphorus, the reaction of the liquid to litmus is observed. In case of an alkaline, neutral or very slight acid reaction, no further investigation for phosphorus is advisable.

In case of a strong acid reaction, the substance is mixed with an equal volume of alcohol, which coagulates albuminous bodies and dissolves but little fat. After a short time it is filtered, the residue washed with weak alcohol, and the filtrate evaporated to a syrupy consistence, when it is to be mixed with at least three times its volume of absolute alcohol. The filtrate is evaporated and the operation repeated twice.

The residue when dissolved in water is neither precipitated by ammonia nor oxalate of potassa, even though phosphate of lime had been intentionally added at the beginning; it is well to become satisfied of the absence of these reactions. To one half of the solution, some zinc and dilute sulphuric acid is added, and the gas conducted into a solution of silver, from which a reduction of silver by phosphuretted hydrogen will take place, if phosphorous acid had been present. The gas will burn with a greenish flame, as was observed by Duflos, without producing a deposit upon porcelain.

The other half is mixed with a few drops of nitric acid, neutralized with pure carbonate of soda, evaporated and heated to redness to destroy fatty acids, then dissolved in water, neutralized and tested for phosphoric acid, when it must not be left out of view that possibly only pyrophosphoric acid may be present. It is not advisable to test before the evaporation for phosphorous acid, because similar reactions may occur with the fatty acids.

The above experiments control one another; if all the reactions take place, we may conclude on the poisoning by phosphorus. (*Arch. d. Pharm. cli.* 138—141.)

J. M. M.

KINIC ACID IN THE LEAVES OF THE VACCINIUM MYRTILLUS.

Zwenger says he has found quinic acid in the leaves of the *Vaccinium Myrtillus*. His process for extracting it is the following: He boils the leaves (collected in May) with milk of lime, and precipitates the clear solution with alcohol. The precipitate he dissolves in water, adds a little acetic acid, and the neutral acetate of lead to throw down the coloring and other foreign matters. After having removed the lead by sulphuretted hydrogen he evaporates the liquor to a syrupy consistence, and then sets it aside for some days, when quinate of lime is deposited. This he dissolves in water, adds sulphuric acid to take away the lime, and evaporates in a water bath. The syrupy residue he dissolves in alcohol, and in this solution there forms sometimes oblique prismatic crystals which possess all the characters of quinic acid.—*Ann. der Chem. und Pharm. from Chem. News, London, Oct. 6, 1860.*

A MALLEABLE AMALGAM FOR DENTISTS.

As to the brittleness which cadmium is said to communicate when combined with any other metal, the facts are, *some* of its alloys, even with malleable metals, are "brittle." But others are highly tenacious and malleable. Its alloys with gold, platinum and copper afford instances of the former. Its combinations with lead, tin, and to a certain extent with silver and mercury, are examples of the latter. An alloy of two parts silver and one of cadmium is perfectly malleable and very hard and strong; with equal parts of each it is also malleable, but possesses less tenacity; but when mixed in the proportions of two parts of cadmium and one part of silver it is brittle. Equal parts of cadmium and mercury form a tough and highly malleable composition; in the proportion of two parts of the latter to one of the former, the amalgam is nearly equal in malleability, but possesses less strength. These mixtures are remarkable in view of the fact that most amalgams are exceedingly frail and brittle. A mixture of two or three parts of tin with one part of mercury is so fragile as almost to drop to pieces in handling; the amalgams with lead, bismuth, &c. are similar.—*Chem. News, London, Sept. 29, 1860.*

ON THE PREPARATION OF ARTIFICIAL COLORING MATTERS
WITH THE PRODUCTS EXTRACTED FROM COAL TAR.

By M. E. Kopp.

(Continued from page 47.)

EXTRACTION OF ANILINE FROM COAL TAR.—The method which appears to be the most rational, and which deserves to be tried, would consist in treating the tar as condensed in gas works, with hydrochloric or sulphuric acid, diluted with 3 or 4 times its volume of water. Mechanical means for affecting the intimate mixture of the tar with the acid might be easily contrived, but in the absence of any special contrivance, the end may be attained by half filling a barrel with the tar, adding one-fifth or one-sixth its volume of acid, and rolling and shaking the barrel until the acid has taken up all the bodies with which it is able to combine; the whole might then be run into a cistern, where by degrees the watery liquid would separate from the tar. The same acid liquid might be used over and over again, until the bases had nearly saturated the acid. A very impure aqueous solution would thus be obtained, but containing the hydrochlorates or sulphates of ammonia, and all the other organic bases contained in the tar, such as aniline, quinoline, pyrrol, picoline, pyrrhidine, lutidine, toluidine, cumidine, &c. By evaporating this solution almost to dryness, and then distilling with an excess of milk of lime, the bases would be set at liberty. Ammonia, as the most volatile, would be disengaged first, and might be condensed apart, and by raising the temperature higher and higher the other bases would be disengaged. Aniline would be found among the liquids distilling between 150° and 250° C.

The manipulation of the tar, however, is an extremely disagreeable operation, and presents many difficulties; it is therefore preferable, in most cases, to distil the tar first, and only operate on the most pure and limpid distilled oils.

Aniline, because of its high boiling-point, is never met with in the light and volatile liquids which first distil from tar. The most of it is found in those which distil between 150° and 230° C. These, according to Hofmann contain about 10 per cent. of organic bases, mostly aniline and quinoline. The oils which

distil above 250° contain mostly quinoline, and very little aniline.

The following is Hofmann's process for extracting the two bases from the oils and separating them. The oil is agitated strongly with commercial hydrochloric acid. The mixture is then allowed to rest for 12 or 14 hours, and the oil is separated from the acid; the latter is treated again with fresh quantities of oil until it is nearly saturated. The still acid solution of the hydrochlorates is filtered through linen or wetted filtering paper, to retain the greater part of the oil mechanically mixed with the watery solution; it is then placed in a copper still, and supersaturated with an excess of milk of lime. At the moment of saturation an abundance of vapors are given off, and the head must be quickly fixed on the still. Heat is now applied, so as to obtain a quick and regular ebullition.

The condensed product is a milky liquid, with oily drops floating on it. The distillation is carried on as long as the vapor has the peculiar odor of the first part distilled, or the condensed product gives the characteristic reaction of aniline with chloride of lime.

The milky liquid is now saturated with hydrochloric acid; it is then concentrated in a water bath; and lastly, decomposed in a tall narrow vessel by means of a slight excess of hydrate of potash or soda. The bases set free, unite, and form an oily liquid, which floats on the alkaline solution. This is removed with a pipette and rectified. The rectified product is aniline, sufficiently pure for industrial purposes, especially if we set aside the part distilling above 200° or 220° , which is principally composed of quinoline.

To obtain aniline chemically pure, the neutral oils forming part of the oily layer must be completely removed. This is done by dissolving the whole in ether, and adding dilute hydrochloric or sulphuric acid, which combines with and separates the bases, and leaves the oils in solution in the ether. The acid solution is then decanted, decomposed with potash, and submitted to careful fractional distillation. If the products are gathered separately in three parts, the first will contain ammonia, water, and some aniline; the second will be pure aniline; while the third portion will contain mostly quinoline. An alcoholic solu-

tion of oxalic acid is now added to the impure aniline, which precipitates oxalate of aniline, as a mass of white crystals, which are washed with alcohol, and then pressed. The salt is then dissolved in a small quantity of water, to which a little alcohol is added. From this solution the oxalate crystalises in stellated groups of oblique rhomboidal prisms. These crystals are decomposed by a caustic alkali, to set free the aniline, and when this is distilled, water at first passes, then water charged with aniline, and lastly, at 182° C. chemically pure aniline.

ARTIFICIAL PREPARATION OF ANILINE BY THE REDUCTION OF NITRO-BENZOLE.—This process, which constitute some of the most curious and important reactions of organic chemistry, allows us to obtain aniline in any quantity. It is not difficult to prepare, but certain precautions are necessary when operating on a large scale.

The process may be subdivided into three distinct operations.

1. *Preparation of Benzole.*
2. *Transformation into Nitro-benzole.*
3. *Reduction of Nitro-benzole to form Aniline.*

1. *Preparation of Benzole.*—The only process we have space to notice is that by which benzole is obtained on a large scale, viz.—the extraction from coal-tar, or from the first products of the distillation of coal-tar, light oil, or crude naphtha.

The manufacturer who wishes to distil tar in order to procure the largest amount of benzole, should choose a light fluid tar, and preferably one distilled from bog head or cannel coal. To form a comparative estimate of the value of different tars, the following experiment may be performed:—About 20 pints of the tar are distilled until the vapors, instead of condensing into a liquid, furnish a product which, on cooling, becomes solid, or of a buttery consistence. By carefully observing when the condensed oil becomes heavier than the water, and measuring the volume of the lighter oils which float on the surface of the water, and then comparing the volumes, we are enabled to estimate with tolerable accuracy the value of the tar. Of course that which yields the largest amount of light oil is the best.

Some account of the process of distillation was given at pages

39 to 47 of this volume, to which we refer the reader, and also to the paper by Mr. Mansfield, in the *Quarterly Journal of the Chemical Society*, i. p. 244.

Crude naphtha, or the benzole of commerce, is generally a yellow or brown liquid, having a density varying from .09 to .95; it usually contains, besides benzole, some of the homologues of benzole, toluol, cumol, and cymol. It is impossible to separate these bodies by an ordinary process of rectification; for although the boiling point of toluol is 108° or 109° , and that of cumol 143° or 145° , their vapors are, so to say, dissolved in the vapor of benzole, and are carried over and condense together. Their presence, however, need not interfere with the preparation of nitro-benzole and aniline.

The benzole found in commerce is at times very impure; some, indeed, has been met with containing but a trace of real benzole. Such an article is generally the result of the distillation of bituminous schists or asphaltum; and, besides hydrocarbons belonging to another series than that of benzole, it generally contains a small amount of oxygenated products, and consequently cannot be advantageously used in the preparation of aniline. It is therefore important to be able readily to detect benzole in a mixture of other oils. For this purpose we may avail ourselves of the facility with which true benzole is converted into nitro-benzole and then into aniline by the action of nascent hydrogen.

The following is Hoffmann's method:—A drop of benzole is heated in a small test tube, with fuming nitric acid, to convert it into nitro-benzole. A good deal of water is then added, to precipitate the nitro-benzole in small drops, which must be taken up by ether. The ethereal solution is then poured into another small tube, and equal volumes of alcohol and dilute hydrochloric acid are added; a few fragments of granulated zinc are then dropped in. In about five minutes sufficient hydrogen will have been disengaged to produce aniline, which will be found combined with the acid. The liquid is supersaturated with an alkali and shaken with ether, which dissolves the aniline set free. A drop of this ethereal solution allowed to evaporate on a watch glass, and mixed after the evaporation of the ether with a drop of a solution of hypochlorite of lime, will show the violet tints

which characterise aniline. The operations may be executed very rapidly, and without any difficulty.

PROPERTIES OF BENZOLE.—At the ordinary temperature benzole is seen in the form of a colorless very fluid liquid, of an agreeable (?) odor, and having the specific gravity .85° at 15° C. At a very low temperature it crystallises or forms a mass like camphor, which melts at 5°. Its boiling-point is between 80° and 81°, and it distils without undergoing any change. It is nearly insoluble in water, to which, however, it imparts its peculiar odor; it is very soluble in wood-spirit, ether, alcohol, the essential and the fatty oils; and it easily dissolves camphor, wax, fatty matters, india-rubber, gutta-percha, and a great number of resins. Among the last, those which are least soluble in it are shellac, copal, and animi. It is very inflammable, and burns with a brilliant smoky flame. Hydrogen gas passed through it, and charged with its vapor, burns with a very clear, luminous flame.

Chlorine and bromine convert benzole into the terchloride and terbromide of benzole. In direct solar light the change takes place very quickly. Concentrated sulphuric acid dissolves benzole, and when the mixture is gently heated, a copulated acid, sulpho-benzylic acid, is formed, $C_{12}H_6S_2O_6$, the hydrogen of which may be replaced by metals. As this acid is soluble in water, we see that in purifying rough benzole with sulphuric acid it is necessary to avoid using an excess of the acid, and also heating the mixture. A solution of chromic acid does not act on benzole, and is therefore a good agent for the purification. Concentrated nitric acid converts benzole into nitro-benzole, to the manufacture of which we next proceed.

PREPARATION OF NITRO-BENZOLE.—The preparation of nitro-benzole is accomplished, on the large scale, by allowing a fine stream of benzole, and another of the strongest nitric acid to run together in a worm or long glass tube kept well cooled. The two liquids react on each other on coming in contact, heat is disengaged, and nitro-benzole is formed. Commercial nitric acid mixed with half its volume of sulphuric acid may be substituted for the concentrated nitric acid. The nitro-benzole

collected at the end of the worm, is first washed with water, then with a solution of carbonate of soda, and afterwards once again with water.

Nitro-benzole is a yellowish liquid which at 15° C. has the sp. gr. 1.209. It boils at 213° , and cooled to 3° it crystallises in needles. Having an odour closely resembling that of the essential oil of bitter almonds, it has been largely used in perfumery for scenting fancy soaps, for which purpose it has one advantage over the oil of bitter almonds—it is less affected by the action of alkalies. It is almost insoluble in water, but is very soluble in alcohol, ether, and the essential oils. Concentrated nitric and sulphuric acid dissolve it, but it is precipitated on the addition of water. It is decomposed by continued boiling with concentrated sulphuric acid; and under the same circumstances with concentrated nitric acid it forms bi-nitro-benzole. Neither the alkalies in strong aqueous solution, nor quick lime act on nitro-benzole; but an alcoholic solution of the alkalies act energetically and form azoxybenzole ($C_{24}H_{10}N_2O_2$). By the action of nitric acid on this last substance a number of other interesting bodies are produced, which, however, it is not necessary now to describe.

TRANSFORMATION OF NITRO-BENZOLE INTO ANILINE.—This is effected by a variety of processes which we shall proceed to describe in detail.

1. *By means of sulphide of ammonium.* An alcoholic solution of nitro-benzole after having been saturated with ammoniacal gas is treated with a current of sulphuretted hydrogen. The liquor now becomes of a deep dirty green color, and deposits a little sulphur. It is now left for twenty-four hours, during which time crystals of sulphur are deposited, the odour of sulphuretted hydrogen disappears, and is replaced by a strongly ammoniacal smell. If distilled now to recover the alcohol, a good deal of sulphur is deposited, and it is impossible to continue the distillation long, because of the violent bumping which ensues. It is therefore allowed to cool and the sulphur is removed. On distilling the liquor again more sulphur is deposited, which must also be removed. The process must be continued, re-saturating the liquor with sulphuretted hydrogen

if need be, until a heavy oily matter (aniline) deposits, which must be separated from the liquor and re-distilled by itself. The aniline is thus obtained nearly pure.

Instead of using an alcoholic solution of nitro-benzole, and treating it successively with ammonia and sulphuretted hydrogen the alcoholic solution of sulphide of ammonium may be prepared beforehand, and the nitro-benzole poured into it. A part is dissolved immediately, and the remainder by dryness in the course of the operation. It is sometimes advantageous, instead of waiting until the aniline separates, to add hydrochloric acid to the liquor in the retort until it is slightly acid, and then to distil almost to dryness, by which means chloride of aniline is obtained. This is decomposed by an excess of caustic soda, and the aniline set at liberty is distilled off.

To avoid any danger from the bumping a tinned copper still must be used, which should be heated by steam under a light pressure. At first the temperature should not exceed 90°C . but after some time it may be raised to 100° or 110° .

The ammoniacal alcohol condensed in the worm may be re-saturated with the sulphuretted hydrogen, and used over again with a new quantity of the nitro-benzole.

2. *Reduction of the nitro-benzole by nascent hydrogen.* In preparing aniline by this process the nitro-benzole and zinc are placed in a vessel and dilute sulphuric or hydrochloric acid is added so as to produce the disengagement of a small quantity of hydrogen. By degrees the nitro-benzole disappears and aniline is formed, which remains in solution in hydrochloric or sulphuric acid. To isolate it, an excess of caustic soda is added and the mixture is distilled, on which the aniline passes over with the vapor of water.

Bechamp first recommended the employment of acetic acid and iron filings. He places in a retort one part of nitro-benzole, one and a half parts of iron filings, and one part of concentrated acetic acid. The reaction takes place without the application of external heat, the mixture becoming hot by itself, and the vapor being condensed in a receiver, which must be kept well cooled. The condensed products consist of aniline, acetate of aniline, and some unchanged nitro-benzole. These are allowed to cool and are then returned to the retort and

again distilled to dryness. The distillate is now treated with potassa fusa, and the aniline separates as an oily layer, which must be removed and distilled once more.

The residue of the mixture of iron filings, acetic acid and nitro-benzole, which remains in the retort after the distillation, still contains a considerable amount of aniline. To obtain this the retort must be washed out with water acidulated with sulphuric or hydrochloric acid and the solution filtered, and then evaporated to dryness. The dry residue is then mixed with quick lime, and placed in a retort of iron or refractory ware and distilled; and the aniline thus obtained must be rectified.—*Chem. News, London, Oct. 1860.*

ON THE PRODUCTION OF CONIUM SEEDS IN THE UNITED STATES.

By HENRY F. FISH, of Waterbury, Conn.

To the question, “Can the seeds of *Conium maculatum* be collected in quantity sufficient for the preparation of Coniyn, (or Conia,) as an article of commerce?” I reply, that on the first day of October, 1859, I addressed printed circulars, embodying a series of inquiries, to a large number of individuals in my own, as well as in other States, and that, to them, I have received only one reply of any practical value.

The questions and their answers are now presented:—

Question 1st, Does *Conium maculatum* grow in your locality? Answer—We raise it.

Question 2d, In what quantity? Answer—1200 to 2000 pounds to the acre.

Question 3d, Is any use made of it? Answer—A large amount of Extract is made.

Question 4th, How many pounds of ripe seeds can be obtained? Answer—100 pounds to the acre.

Question 5th, At what probable cost by pound? Answer—From 25 to 33 cents.

Question 6th, Can you engage in their collection? Answer—If any demand was made, we would do so.

Answer returned by Charles T. Carney, of Boston; informa-

tion communicated by S. T. Atherton, South Groton, Middlesex county, Massachusetts.

I may add, that *Conium maculatum* grows wild, abundantly and luxuriantly, in many towns in the State of Connecticut; in some places so thick, in patches, as to be mown down with a scythe. Judging from the fact that it is regarded as a pest rather than otherwise, on account of its abundance, its poisonous properties and its tenacity of life, I have no reasonable doubt but that many hundreds of pounds of ripe seeds may be procured this fall, within a radius of thirty miles of my own locality, and that any demand arising for it would bring into market within a twelve-month, an abundant supply.

I will pursue the subject farther if deemed necessary.—*Proc. Amer. Pharm. Asso.*, 1860.

ON THE RELATIVE VALUES OF SOCOTRINE AND BARBADOES ALOES.

BY MR. RICHARD W. GILES.

The therapeutic importance of aloes may be inferred from the circumstance that there is no purgative pill in our present Pharmacopœia into the composition of which it does not enter. It constituted more than 50 per cent. of the compound extract of colocynth P. L. 1836, and is besides a chief ingredient in the pill popularly known to the humbler classes as "*Pil. Cocciaë*." In any other form than that of a pill it might have been supposed that its extremely nauseous taste would have prevented its administration, yet we find the compound decoction is in great demand both as a pharmacopœial preparation and as an old-fashioned domestic medicine, with many modifications, under the name of "*Baume de Vie*."

In the Pharmacopœia of 1851 (for the first time, I believe), Barbadoes aloes finds a place, but its employment is only directed in one instance—*Pil Aloës c. Sapone*,—on account of which it is probable that it was exclusively introduced. It would seem to be by inadvertence that it is permitted *sub silentio* in the *Enema Aloës*. The inquiry to which I desire to direct the attention of the Society is, whether the comparative value of the two descriptions of aloes, viz. Barbadoes and Socotrine

(including Hepatic), is fairly represented by the positions they respectively occupy in our Pharmacopœia. In my opinion it is *not* fairly represented, but, on the contrary, so far as my observation goes, the Barbadoes is a better description of aloes for medical purposes, acting in a preferable manner as a purgative to the Socotrine. This opinion has been held by some medical practitioners, including apparently the late Dr. Marshall Hall, from whose original and favourite formula known as Pil. Aloës Diluta, our Pharmacopœia has borrowed the directions for the preparation already spoken of under the name of Pil. Aloës c. Sapone.

It is well known that many patients have a strong objection to the use of ordinary aloes, and we must all have noticed the solicitude manifested by such persons to have their prescriptions dispensed with the veritable aqueous extract instead of the crude drug. Now it is worthy of remark that the per-centage of aqueous extract in Socotrine aloes is about 56, and in Barbadoes about 80; and it almost follows that if the aqueous extract is really preferable in its operation, according to the concurrent belief of the faculty and their patients, *that* description of aloes must be the best which contains the largest proportion of aqueous extract.

But in addition to this, Messrs. Smith of Edinburgh by their discovery of aloin, seem to me to have supplied a further *a priori* argument in favor of Barbadoes aloes. From their experiments (*Ph. Journal*, vol. xi., p. 23) it appears that aloin is at all events obtained with greater facility from Barbadoes aloes than from any other description; and although the contradictory statements which have been published with reference to this substance are somewhat perplexing, we may safely conclude that the purgative properties of aloes are due to it in part, if not wholly, and that the facility with which it is obtained from the Barbadoes variety, indicates its abundant presence in a condition unaltered by the process of inspissation, which cannot be said with equal confidence of Socotrine aloes. (*Vide* Dr. Pereira's paper on Aloe Juice, *Ph. Journal*, xi., 439.)

The favorable estimate of Barbadoes aloes, deducible from its relation both to the aqueous extract and to aloin as above described, has been confirmed by my own experience, for after

arriving at the conclusion that the Barbadoes was medicinally the best kind, I began by substituting it for Socotrine in the compound rhubarb pill prepared for retail purposes, and since that time have so constantly heard that the pills thus made are preferred to others, that it is impossible to resist the conviction that there is a very marked superiority in the action of Barbadoes as compared with Socotrine aloes. More recently I have carried the substitution a step further, by employing the aqueous extract instead of the crude aloes; but, although I am still inclined to recommend this second change, as rendering the improvement more complete, I cannot say that it has produced equally marked results, and I am only more strongly convinced that the advantages which have been stated are special attributes of the Barbadoes variety of aloes.

I will only add to these remarks an extract from Pereira's *Materia Medica* bearing on the subject. Comparing the varieties of aloes, he says, "Socotrine aloes has long been regarded as the best kind of aloes, though its commercial value is now below that of Barbadoes. It is, I suspect, inferior in activity." (Per., *Mat. Med.*, 3rd edition, vol. ii., p. 1077.)

In his lectures Dr. Pereira used to tell his class that Russian castor, though comparatively worthless, was sold for £2 per ounce, while the American, rich in resin, fetched but 20s. per pound. This may teach us that a traditional preference sometimes attaches to an article less abundant in the market, though intrinsically less valuable; and I have some suspicion that this applies to the varieties of aloes.—*London Pharm. Journ.* Dec. 1860.

ACETUM IPECACUANHÆ.

By MR. GEORGE JOHNSON.

Some time ago I was anxious to find some cheap menstruum for the active principle of ipecacuanha, *i. e.* emetina; and on reading the article relating to that substance in Pereira's *Materia Medica*, I found that emetina is easily and entirely soluble in acetic acid.

I at once thought, why here is the very thing I want; and

accordingly tried the experiment of making an acetic solution of the root, which I did in the following manner:—

Two and a half ounces of ipecacuanha were finely bruised, and allowed to macerate for twelve hours in five fluid ounces of acetic acid. Thirty-five ounces of water were then added, and the maceration continued for twenty-four hours longer, with frequent shaking. The solution was then filtered, and the residuum strongly pressed. The resulting solution is of a rich brown color, very similar to well-made ipecacuanha wine, and when tested, either chemically or medicinally, is nearly double the strength of that preparation.

Being carefully neutralized with ammonia, and treated with a few drops of tincture of galls, a precipitate of tannate of emetina is produced, much larger in amount than that from an equal quantity of ipecacuanha wine similarly treated. I have supplied two medical friends with a portion of the preparation, and they report very favorably as to its effects, both as an expectorant and emetic. One of them administered fifteen drops to one of his own children, about one year and a half old, and it produced instantaneous vomiting; and in another child of five years old the same quantity produced nausea and retching.

This preparation has several important advantages over the ipecacuanha wine, among which I suggest the following:—

1st. It is cheaper, not being half the price of the old preparation, and if introduced into the Pharmacopœia it would be a boon to medical men who dispense their own medicines, and particularly to the medical officers of hospitals and dispensaries, who, from motives of economy, frequently use tartar emetic as an expectorant, when, if there was any cheap preparation of ipecacuanha, they would gladly and frequently substitute it.

2d. This preparation could be made of a uniform strength, and might always be depended on, whilst the wine, containing a variable per centage of alcohol, will vary in a like proportion in the quantity of active matter dissolved.

3d. The *acetum ipecacuanhæ* will keep for a long time without undergoing decomposition or depositing a sediment. Ipecacuanha wine, however well prepared, or however bright it may be when recently made, soon becomes cloudy, and deposits a dirty sediment. This most probably represents a portion of its

active matter, and if so, every month it is kept its efficacy must be diminishing. Add to this fact the one just before alluded to—viz. the possible original deficiency of alcohol in the wine employed—and, however charitably disposed we may be, we can hardly avoid the conclusion, that much of the ipecacuanha wine dispensed is not of much therapeutical value.

These advantages of the *acetum* over the *vinum ipecacuanhæ* have appeared to me so great as to entitle the former to a place in the Pharmacopœia; hence my present communication. I hope the subject may be viewed in the same light by the Pharmacopœia Committee, and that they will lay it before the Committee of the College; for if the latter should decide to adopt the preparation, I should have the happiness of feeling that I had done a little, though *but* little, for the advancement of Pharmacy. —*London Pharm. Journ. Dec. 1860.*

PATENTS IN THEIR RELATION TO PHARMACY.

BY EDWARD PARRISH.

The practice of all civilized nations recognizes the utility of securing to the inventor the profits arising from his ingenuity and industry, by imposing legal restrictions upon its unauthorized use by others. So universally is this the case, that the moral or ethical view of the subject is seldom spoken of or discussed. The product of a man's mind is presumed to be as much his own as the product of his hand; his ideas as much his property as the results of his labor, and no one seems to dispute it. And yet there is a certain point of view from which the fact of thinking a happy thought and working out a good result, appear widely different. In nothing else has a man so sure a title as in the product of his own industry; but whence came those flashes across his mind which he calls ideas? Are any of these purely his own? Has he not inhaled the prevailing thoughts of his age and of past ages (which are all embodied in the present) as he breathes the atmosphere around him? Who can tell from whence any great inventor has derived the initial idea of his invention, or what inventor can even answer this to himself?

But on the other hand, if thought be mental labor, why are

not its results just as much property as the results of manual labor?

These considerations have engaged my attention in endeavoring to determine the right and wrong of patents in medicine. I confess they offered me no satisfactory starting point for a discussion of the question; it seems to resolve itself into one of humanity and expediency, and here we have, perhaps, firmer ground to tread upon.

It is alleged that the direct effect of the patent laws is to stimulate invention; that men direct their mental energies in this direction, entirely from the hope of profit, and the public are therefore benefitted by them, though there may be an apparent monopoly in each case of their operation; granting this, the question becomes a simple one as to the degree in which society is likely to be benefitted by their application to any particular pursuit.

In the matter of medicines, the profession to whom the healing art is mainly intrusted, is pretty unanimous in maintaining that no interest of an inventor should stand in the way of the free and unrestricted use of every improvement that the ingenuity of man may devise either in the means of cure, or the modes of applying them. It is the boast of the liberal profession of medicine, that what ever is known by one as valuable or useful for alleviating pain or restoring the diseased to health, may be freely known to all and used without restriction.

That this is expedient in the case of physicians is scarcely doubted by any thoughtful person; it certainly takes away one motive for the application of ingenuity in the difficult art of healing, but we can not ignore the superior force of the higher motives which influence the conscientious practitioner. In no other profession have we so noble an example of liberality in communicating and applying the results of experience and the deductions of science to the relief of suffering, and none have so rich a reward in the esteem and gratitude of the public. The medical profession is, however, very different from ours. Manufacturing and merchandizing are our chief pursuits, our motive is more immediately pecuniary, though the liberalizing influences of science, and especially our connection with the relief of those maladies which are the common lot of our race, modify the

motives which pertain to ordinary business, and lead us into affiliation with the liberal professions. Competition, which is the great moving spring of business, is partially shut out of the profession of medicine; physicians professedly ignore it entirely, yet we all know that it operates practically with more or less force upon them, and we see its effects in our daily intercourse with the public, however, they may seek to conceal it from their professional brethren.

With us, however, there is no concealment of competition. We are all trying for business; competing openly, and I hope for the most part honorably, with our neighbors, and it need not affect our friendly relations, though it does somewhat modify our course in regard to the subject we are discussing. To us a new invention inevitably presents itself in a business aspect, while to the true physician its humanitarian bearings are most prominent, and this, it seems to me, puts us in different positions in regard to the question of patents.

Perhaps I here do injustice to our profession, which presents many conspicuous instances of the most liberal and professional spirit; its Colleges, its journals, and this Association, as far as they go, are palpable testimonials to its comparative freedom from niggardly motives, from the hoarding of ideas and experiences which from their very nature ought to belong to the common stock; still I rely upon the discernment of my hearers to recognize the difference to which I refer as inherent in the nature of the two pursuits,—the one strictly a liberal profession,—the other a combined profession and trade. It is true, we do not sanction concealment in regard to the composition of medicines we may originate, but we do not compel a disclosure of all the results of our experience in its preparation. We do not conceal the knowledge we possess of the best means of judging of the quality of drugs, but we do not necessarily tell our competitors where best to obtain them or how to render them most attractive to customers.

Inventions of value, present the strongest cases for the exercise of concealment; unless some means are provided for the protection of the inventor in the legitimate fruit of his ingenuity; and concealment is the worse evil to society in the case. On the other hand, in case of inventions of real and permanent value

which are the only ones of much utility to the inventors, the public must be the losers just so far as free and open competition is shut out.

The opposite extremes which prudence would seem to indicate we should avoid, are perhaps best provided against by the course which I understand the professional sentiment now allows among the more respectable pharmacutists. As a profession, we recognize no patenting of medicines, and the U. S. Commissioners, at the Patent Office, rarely allow this class of patents when applied for; and in the few instances in which they grant them, merely patent "the compositions of matter," never patenting them as specifics for any particular diseases, nor as remedies possessed of any special therapeutic properties. In fact, so opposed is the system of patenting to the interests of those who prepare and vend proprietary medicines, that the chief applications come from western practitioners for "blood purifiers," "female aids" and other abominations, few of which possess the requisite originality to claim a patent, and from none of which would the public gain anything, in the event of their being fostered into life by the aid of our laws. Some of the countries of Europe refuse patents for food or medicine, and I believe the number issued in any country to be small. The number of patents issued for medicines in this country in a year, does not exceed six or eight.

The idea that a medicine is patentable at all, is liable to one objection which I may here state. The medical colleges, holding characters from the several States, are understood to grant in their diplomas the right to prescribe and compound all the "compositions of matter" applicable to the cure of disease. Has the U. S. government a legal right to contravene or limit these chartered rights of physicians by declaring that any particular combination shall not be prescribed or administered except by a certain patentee?

The views advanced in relation to patenting medicines does not apply equally to processes or to forms of apparatus used primarily or incidentally in their preparation. A patent seems here to be legitimate and of service as a stimulus to invention and a reward or compensation for the investment of time and money in perfecting it.

Without this stimulus, few men would employ themselves in perfecting those processes upon the improvement of which the progress of pharmacy, as well as of kindred arts, so entirely depends, and the public would be the losers.—*Proc. Amer. Pharm. Asso.*, 1860.

ON THE MANUFACTURE OF OXYGEN.

BY MM. H. ST. CLAIRE DEVILLE and H. DEBRAY.

Commissioned by the Russian Government to study the dry treatment of platinum ore, and the revivification of this precious metal by fusion according to the new metallurgic processes proposed by us, we have directed our later researches to the economical preparation of oxygen; and feeling convinced, from the point to which we have brought this question, that manufacturing industry, either as regards lighting or the working of metals, will derive benefit from our experience, we extract from the report addressed by us to the Russian Minister some brief details respecting the wholesale manufacture of pure oxygen.

We have experimented on large quantities of oxygen, and have successively extracted it from the following materials, viz., manganese, chlorate of potash, chloride of lime, nitrate of soda, nitrate of baryta, binoxide of barium, sulphate of zinc, and sulphuric acid. We will confine our remarks here to the last two substances, which are employed for the first time to our knowledge in the extraction of oxygen. We will first mention that we have repeated on considerable quantities of binoxide of barium the process of M. Boussingault, and have obtained the same results as that gentleman, though meeting with some practical difficulties, which, however, can easily be surmounted in a manufactory as soon as baryta by M. Kuhlmann's operations can be supplied commercially in sufficient quantities, and at a low rate, in the anhydrous state. It can then be easily and economically utilised for the production of oxygen.

Sulphate of zinc, which can be obtained in such large quantities by the action of the galvanic pile, is a substance not much in use at the present time; all its elements may be utilised in

the following manner:—By calcining it alone in an earthen vessel it is transformed into a light, white oxide, which, when the sulphate is pure, can be used in painting; into sulphurous acid, which is collected in a concentrated solution, or as a sulphite, which is now applied to numerous purposes, and, lastly, into pure oxygen. The complete decomposition of sulphate of zinc does not require a much higher temperature than for the decomposition of manganese; it can be completely transformed into oxide of zinc and into a mixture of water, sulphurous acid, and oxygen. These are separated by the process which will presently be described for the preparation of oxygen by sulphuric acid.

Sulphuric acid decomposes at a red heat into sulphurous acid, water, and oxygen, in a very simple apparatus; a small retort, holding five litres filled with thin leaves of platinum,* or, better still, a worm of platinum filled with sponge of this metal and made red hot. Introduce into it by an S-tube a small stream of sulphuric acid, issuing from a vessel at a constant level. The gases which escape pass first through a refrigerator, which separates the water from them, and then into a washer, of a special form, which it is here unnecessary to describe. Pure inodorous oxygen and a saturated solution of sulphurous acid are the constant results. If the washing-water is replaced by lixivium of soda, bisulphite of soda, saturated with sulphurous acid, is obtained, which can be neutralised by carbonate of soda, and transformed into neutral sulphite or hyposulphite.

If the water charged with sulphurous acid is passed into the generator which feeds the lead-chambers in a sulphuric acid factory, the sulphurous acid will be transformed into sulphuric acid at the expense of the atmospheric oxygen. We have calculated that it would suffice to burn in the sulphur furnace of a sulphuric acid apparatus double the quantity of sulphur contained in the concentrated solution of sulphurous acid in order to entirely utilise the latter gas, so that with one apparatus, without sensibly augmenting the expense, we could appropriate a third part of the sulphuric acid which it produces to the pre-

* In large vessels the leaves of platinum may be replaced by pieces of brick.

paration of oxygen. As to the net cost, calculated on these data, it is so slight that it is impossible to give the exact figure or even an approximation to it. In fact, we have only to reckon as cost the very little coal required to maintain a small apparatus at red heat, and the nitrate of soda employed to determine the union of the atmospheric oxygen with the sulphurous acid; for our process consists really in taking oxygen from the air. Moreover, supposing the sulphurous acid proceeding from the decomposition of sulphuric acid to be lost, yet this sulphuric acid still remains the most economical agent for the production of oxygen, which does not cost 70 centimes for a cubic metre when crude acid is used, and which is, therefore, in this respect, for superior even to binoxide of manganese.—*Chem. News*, Dec. 1860, from *Comptes-Rendus*.

TIN.

If there be any one substance more than another that has rendered England famous throughout the world, it is tin. Camden, the historian, supposes that this country, from the abundance of tin which it contains, was called Britain. In the Syriac language *varatanac* signifies *land of tin*; whence is derived Britain. The mention of tin by Moses, in the 31st chapter of Numbers, 22d verse, is a proof of its being known from the most remote antiquity. Long before the Christian era the trade in tin caused many a vessel to spread its sails in the Mediterranean Sea, and to cross the Bay of Biscay to fetch it from these shores. The alchemists of old considered tin to be a mixture of silver and lead, but modern chemistry proves it to be a distinct metal. About 10,000 tons of tin are extracted every year from the mines in Cornwall and Devon, nearly the whole of which is consumed in the manufacture of tin-plate (*fer-blanc*, or white iron, as the French term it), that is, sheet iron coated with tin; and it is this substance which constitutes our famous tin-ware, which finds a market from Naples to Japan, from New York to Eupatoria. Melted tin forms a sort of varnish for iron, and prevents that metal from rusting; when copper is coated with it verdigris cannot be produced. Tin and lead melted together produce what is called “*Britannia metal* :” of which tea-

pots and similar domestic utensils are made. It is owing to a mordant of tin that the dyer produces the fine scarlet cloth so famous as the Royal and Military color of this country. In many other ways we could show how very useful tin is ; but it is enough for us to state that England is the tin-plate manufacturer for the whole world.—*Chem. News*, Dec. 1860, from *Piesse's Laboratory of Chemical Wonders*.

ON THE DETECTION OF TARTAR IN VINEGAR.

BY M. L. DUSART.

The inquiry instituted by M. Dusart is founded on the solubility of potassio-tartrate of iron. The vinegar is evaporated to the consistence of extract, a little of which is dissolved in water, a few drops of solution of perchloride of iron are added, and the whole is boiled, and then sufficient solution of potash to give the liquid an alkaline reaction is poured in, then it is filtered.

If sulphuretted hydrogen indicates the presence of iron in the liquid, and produces no reaction in an alkaline liquor prepared with extract of vinegar without the addition of chloride of iron, we may infer the presence of tartaric acid, or at least the necessity for a stricter search, which is quite superfluous if the reagent does not color the liquid.

No similar results are obtainable from mineral, oxalic, malic, or citric acids. A counter-proof is always useful, because accidental substances, tartaric acid for instance, dissolve the sesquioxide of iron in an alkaline medium.—*Chem. News*, Dec. 1860, from *Répertoire de Chimie*.

CADMIUM.

By B. Wood, M. D.

The properties of cadmium appear to have been less clearly determined by chemists and metallurgists than those of most other metals. Discrepancies exist in regard to it, while some of its most remarkable, if not most useful, properties are not at all noticed, at least by the generality of authors, even when explicit and elaborate as to similar properties possessed by other

metals. Our ordinary works on chemistry treat of the metal very briefly, as of little importance—one of the latest says, it “has *no* practical value in the arts:”—but if duly investigated it will be found, I think, to possess qualities highly useful to the arts as well as interesting to science.

The melting point of cadmium is variously stated by authors. Some place it indefinitely, “below a red heat.” Overman in his *Treatise on Metallurgy*, marks it at 550° Fahr., and indicates 600° as the temperature at which the metal volatilizes. Brande, *Dict. Science and Art*, says “it fuses and volatilizes at a temperature a little below that at which tin melts.” Webster, *Manual of Chemistry*, states that “it melts and volatilizes by a heat not much greater than that required to vaporize mercury.” Most of our chemical text-books put its melting point at 442° (from Stromeyer). While the *New American Cyclopædia*, now in course of publication, places it, on the authority of Daniell, at 360° Fahr.

It would be interesting to determine this accurately. But the heat being too high for measurement by the mercurial thermometer, and having no other, I have only been able to judge approximately by comparative tests. Melted under similar conditions with other metals, I find the metal requires for its fusion nearly the same heat as lead. It is somewhat later in melting, but on the other hand it appears to congeal a little the sooner, (which may be due to a difference in the conducting power of the two metals.) I should, therefore, place its melting point in round numbers at 600° Fahr., that of lead being placed by different authors, at 594° , 600° , and 612° . It volatilizes at a somewhat higher temperature, giving off orange-colored suffocating fumes, which, when inhaled too freely leave a disagreeable, sweetish, styptic sensation upon the *lips*, and an intolerable and persistent brassy taste in the mouth and fauces, with constriction of the throat, heaviness in the head, and nausea.

Of the general properties of cadmium as an ingredient in alloys, Overman, who I believe is high authority in metallurgy, and who, although too broad in some of his conclusions, is more rigidly exact in respect to the individual instances adduced than others that I have had the opportunity of examining, says:

“Cadmium is very soft and malleable and still all its alloys

are brittle. Its combinations are not distinguished for fluidity." Again, "The combinations of platinum, copper, and other metals with cadmium, are brittle and hard." The cause of this he ascribes to "its volatile nature and want of affinity," which, recurring to the subject, he accounts for thus :

"When it is melted with any other metal there is a tendency on its part to evaporate ; the slight affinity of cadmium for other metals causes a separation of its atoms from those of the other metal, and no intimate union can be formed. If, therefore, the alloy cools there are spaces between the crystals which have been occupied by the expanded atoms of cadmium, and in cooling, these are filled again ; this causes brittleness." *Treatise on Metallurgy*, p. 465.

All this is strictly true of *some* of its combinations, such as the particular instances which he cites, although by no means of "all," as will presently be seen.

Other authors, although less explicit, are to a like import, ascribing a similar general character to the metal, with examples in illustration, and without instancing any exceptions.

In a copy of an article on Alloys of Cadmium, from *Berthier's Traité des Essais*, tome 2, p. 530, furnished me by the patent office as authority on the subject, I find it stated in general terms that "most of the alloys of cadmium are brittle:" the individual alloys cited are particularly characterized as brittle, and no mention is made of others.—The combination with mercury is thus described : "Cadmium unites with great facility with mercury, even when cold. The amalgam is of a silver white, and texture granular and crystalline. It can be obtained in octohedrons. It is hard and very fragile. Its density is greater than that of mercury. It fuses at 75° [centigrade.] It contains 0.217 of cadmium."

Combined in these proportions the compound will indeed be comparatively fragile ; but one might be led to infer from this description that the metals combine in no other proportions. I have seen this particular form of amalgam cited by other authors when speaking of the combination of cadmium with mercury, but without any allusion to other compounds of these metals ; although they unite with facility in other proportions, forming amalgams particularly noteworthy as contrasted with those of other metals.

While it has been assumed as a general rule as above quoted, that the combinations of cadmium are not distinguished for fluidity, I have not found its fluidifying properties in respect to certain metals and alloys noticed in any work to which I have had access. *Some* of its alloys indeed are *not* remarkable for fusibility, but rather for the reverse; such are its alloys with silver, antimony, and mercury, their melting point being but little lower or even higher than that of the mean of their constituents. But others are much more fusible than the mean, as its alloys with lead, tin, copper, bismuth, zinc. In certain instances it manifests this property in so eminent a degree that it is singular it should not, if known, have been explicitly stated in all professed descriptions of the metal. Bismuth holds a high rank among metals for its property of promoting fusibility in alloys, as is particularly remarked in all chemical text-books, and wherever the metal is treated of, its alloys with lead and tin being specially noted as extraordinary instances. But in some combinations cadmium displays this property more decidedly than even bismuth. The alloy composed of from one to two parts of cadmium, two parts of lead, and four parts of tin, is more fusible than the corresponding alloy of two parts (or less) of *bismuth*, two of lead and four of tin. In smaller proportions its superiority is still more marked, requiring much less to produce the same effect, while it does not impair the tenacity and malleability of the alloys, but confers hardness and general strength.

As to the brittleness which cadmium is said to communicate when combined with any other metals, the facts are, *some* of its alloys even with malleable metals *are* "brittle." But others are highly tenacious and malleable. Its alloys with gold, platinum, and copper, afford instances of the former. Its combinations with lead, tin, and to a certain extent with silver and mercury, are examples of the latter. An alloy of two parts silver and one of cadmium is perfectly malleable and very hard and strong; with equal parts of each it is also malleable but possesses less tenacity; but when mixed in the proportions of two parts of cadmium and one part of silver, it is brittle. Equal parts of cadmium and mercury form a tough and highly malleable composition; in the proportions of two parts of the latter to one

of the former; the amalgam is nearly equal in malleability, but possesses less strength. These mixtures are remarkable in view of the fact that most amalgams are exceedingly frail and brittle. A mixture of two or three parts of tin with one part of mercury is so fragile as almost to drop to pieces in handling: the amalgams with lead, bismuth, &c., are similar.

The fusibility of the compounds of cadmium and mercury is nearly that of the mean of their constituents, as indeed, appears to be the case with other amalgams. I do not perceive that mercury acts as a fluidifying agent in alloys—it does not strictly promote fusibility but serves merely to communicate of its own fluidity to the compounds in nearly the ratio in which it is employed; it does not, like cadmium, bismuth, &c., confer any new property in this respect. Being fluid at 39° below the zero of Fahrenheit's scale, it will of course, if it only retains its own property, reduce the melting point of the compounds into which it enters as an ingredient, below that of the metals with which it is united.

Most of the mixtures of mercury with other metals, although it may form certain definite compounds with them, indicate combination by simple solution and mechanical admixture rather than by chemical affinity. With cadmium, however, it exhibits a marked affinity for forming amalgams, or as they might be appropriately designated, *alloys* which possess distinctive characters, indicating a true chemical combination.

But I leave these speculations to professed chemists, hoping the points herein referred to may serve to incite attention to a subject which I think will repay investigation.—*Journ. Franklin Institute, Aug. 1860.*

ON THE PREPARATION OF HYDROGEN REDUCED IRON, AND ON THE MEANS OF PRESERVING IT FROM OXIDATION.

By M. S. DE LUCA.

Pure iron in a state of minute division, known by the name of "iron reduced by hydrogen," so much used in medicine, is now largely manufactured, but without the least security as to

its purity. Iron, prepared for industrial purposes, is almost always impure, for the simple reason that in its wholesale manufacture the purification of the re-agents and of the products is only partial; there is a limit at which we must stop, but at which we do not find that degree of purity which should always characterise substances introduced into the animal economy. Moreover, the reduced iron of commerce is often mixed with fine iron filings, and sometimes it even consists entirely of ordinary iron reduced to very fine powder by a filing machine.

It is, however, easy to detect these sophistications. It is sufficient to treat the suspected iron by a pure diluted acid, which, if the iron is pure and contains no ordinary iron, will dissolve it, and produce a limpid solution free from residue. This process also affords indications of the sulphur contained in almost all reduced irons more or less abundantly; it can be detected by paper saturated with a solution of acetate of lead, placed in contact with the hydrogen which is evolved when iron is treated by a dilute acid, the paper becoming black if sulphur is contained in the iron.

It is very important to obtain iron exempt from sulphur, but it is impossible to get it pure by the ordinary industrial process; it must, in fact, be prepared in the laboratory with scrupulous care. To procure pure iron, an oxide of iron of almost absolute purity must be first prepared; but if this oxide is obtained by decomposing the sulphate of iron, it is almost impossible to get rid of a portion of adherent sulphate, which repeated washings fail to remove. It is preferable to decompose an acid chloride of iron by ammonia, in order to obtain the oxide pure. Hydrochloric acid eliminates all the sulphur from the iron, under the form of sulphuretted hydrogen, and boiling the acid solution is a sure means of driving off all trace of this gas which may lurk in the solution. Then, by precipitating the chloride of iron by ammonia, soluble and volatile compounds are formed, easily eliminated by heat and washing.

When we propose to obtain iron free from sulphur, it is not sufficient to provide pure oxide of iron; the hydrogen itself which is employed in excess in the operation of reduction must contain no sulphur. Those accustomed to the practical operation of a laboratory, and familiar with chemical manipulation,

can appreciate perfectly all the difficulties to be encountered in purifying gas. The affinities between gaseous substances and re-agents are very limited, particularly when the latter are liquids; prolonged shaking is frequently requisite to obtain complete absorption; and it is scarcely necessary to recall here the fact that 3000 shakings are sometimes necessary to force sulphuric acid to absorb olefiant gas. Then, to purify hydrogen, there must be a slow disengagement of gas, which must be distributed through porous bodies, saturated with the proper re-agents, and these bodies must be introduced into tubes vertically disposed, and the gas enter at the superior extremity of these tubes. Thus hydrogen, notwithstanding its great lightness, traverses these tubes from above downwards, and comes in contact with the re-agents, depositing its impurities and losing all its sulphur.

The simple friction of the vulcanised india-rubber tubes generally used for connecting the different parts of apparatus, is another source of sulphur. A current of pure hydrogen or pure carbonic acid passed through these tubes will produce in the water through which the gases bubble up a deposit of sulphur, which can then be transformed into sulphuric acid by the action of nitric acid, and which can be weighed in the state of sulphate of baryta. Therefore, if india-rubber tubes are used, they should be boiled in a solution of potash before they are employed to join the different parts of a hydrogen apparatus, when this gas is employed to reduce the oxide of iron.

For the preservation of reduced iron from oxidation, it should be put into previously dried glass bottles; and this operation should be effected in an atmosphere of hydrogen. The iron should be introduced by means of glass measures, containing exactly a given weight of iron. The bulbs must then be sealed with the blowpipe. Thus it appears that all the reduced irons of commerce which have been examined contain sulphur; that they often deposit silica and blackish substances when treated by weak acids, and that consequently they are impure. It would be well if pharmaceutical chemists would themselves carefully prepare iron used for medicinal purposes, since manufacturers can only supply it of a relative purity.—*Chem. News, from Journal de Pharmacie et de Chimie*, t. xxxviii. p. 275.

A COMPOSITION NAMED ZEIODELITE,

A kind of Paste which becomes as hard as Stone, is unchangeable by the Air, and being proof against the action of Acids, may replace Lead and other substances for various uses.

By JOSEPH SIMON.

Zeiodelite is made by mixing together 19 lbs. of sulphur and 42 lbs. of pulverized stoneware and glass. The mixture is exposed to a gentle heat, which melts the sulphur, and then the mass is stirred until it becomes thoroughly homogeneous, when it is run into suitable moulds and allowed to cool. This preparation is proof against acids in general, whatever their degree of concentration, and will last an indefinite time. It melts at about 120° Centigrade, and may be re-employed without loss of any of its qualities, whenever it is desirable to change the form of an apparatus, by melting at a gentle heat and operating as with asphalte. At 110° Centigrade it becomes as hard as stone, and therefore preserves its solidity in boiling water. Slabs of zeiodelite may be joined by introducing between them some of the paste heated to 200° Centigrade, which will melt the edges of the slabs, and when the whole becomes cold it will present one uniform piece. Chambers lined with zeiodelite in place of lead, the inventor says, will enable manufacturers to produce acids free from nitrate and sulphate of lead. The cost will be only one-fifth the price of lead. The compound is also said to be superior to hydraulic lime for uniting stone, and resisting the action of water.—*Journ. Frank. Ins.*, from *Lond. Chem. News*.

EXPERIMENTS ON SPERMACETI OINTMENT AND OLIVE OIL

By MR. J. B. BARNES.

On the 6th of October, 1858, a paper by Mr. Richard Giles, of Clifton, was read in this room, on the preparation of spermaceti ointment. Differences of opinion were expressed; Dr. Redwood defended the practice of using bleached olive oil in this preparation. "He stated that the specimens of olive oil in the museum of this Society were always colorless, in consequence of their being exposed to the light in a glass case, and

could it be said that this oil was unfit for use? Mr. Barnes had stated, when bleached, it was more liable to become rancid. Possibly this might be the case when chemical agents were used for bleaching it, but he was not aware that it was necessarily more prone to become rancid when colorless than in the ordinary state. Indeed, there were some circumstances which would seem rather to lead to an opposite conclusion. Thus, he had observed that during the bleaching of olive oil, there was usually a deposit formed, consisting of flocculent matter, and this organic matter, if retained in solution, would be likely to promote the kind of change which occurs when the oil becomes rancid.

“The public approved of spermaceti ointment made with bleached oil, and until it could be shown that this was inferior to the other, he thought it too much to condemn the bleached oil as an unwarrantable deviation from the instructions of the Pharmacopœia.”

Believing that this question could not be settled by words only, I determined upon making a few experiments, in order to ascertain which is the best preparation—that made with natural yellow olive oil, or that made with bleached olive oil. Also to discover whether olive oil exposed to light alone, would bleach and whether the bleaching by that agent would remove its characteristic odor and render it rancid.

On the 12th of October, 1858, I had these four specimens of spermaceti ointment prepared. No. 1 was made with *sweet* olive oil of the usual yellow color, white wax, and spermaceti. No. 2 with *sweet* olive oil (yellow), unbleached bees' wax, and spermaceti. No. 3 with fresh olive oil, bleached by means of animal charcoal, spermaceti, and white wax. No. 4 with fresh lard, white wax, and spermaceti. The Pharmacopœia proportions were employed. These ointments have been kept loosely covered in ordinary covered pots in the shop, exposed to the usual changes of temperature.

At the end of three months I examined them, and found Nos. 3 and 4 decidedly rancid and unfit for use, whilst No. 1 and No. 2, those prepared with unbleached materials, were quite good, possessing the usual pleasant smell of good ointment. In order to ascertain how long Nos. 1 and 2 would continue

good, they were set aside, and have again been examined, together with Nos. 3 and 4, after the expiration of two years.

Small quantities of each specimen, Nos, 1, 2, 3, and 4, were boiled in separate portions of distilled water. After cooling, the water was poured off from each and tested with blue litmus paper, and the following results were obtained :—Nos. 3 and 4, the bleached oil and lard preparations, instantly reddened the test paper in a most decided manner; whilst No. 1, made with unbleached olive oil, white wax and spermaceti, showed only a *very* slight indication of the presence of an acid, and not until some moments had passed did the paper become slightly reddened. No. 2, the specimen prepared with unbleached oil, yellow wax and spermaceti, did not exhibit the smallest indication of the presence of an acid. And, moreover, you will perceive, upon smelling these ointments, that No. 1 has only the slightest possible rancid odor, and that No. 2 has not the faintest trace of rancidity; in fact, it is as good now as it was the day it was prepared; whilst Nos. 3 and 4 are most decidedly rancid and quite unfit for use as ointments.

These results have exceeded my expectations. I scarcely thought it possible that spermaceti ointment prepared with unbleached oil would keep so perfectly good for so long a period as two years. The ointment made with both unbleached oil and wax is undoubtedly the best; therefore, I think the Pharmacopœia Committee should recommend the employment of unbleached bees' wax in the preparation of this ointment and cerate.

It is to my mind very evident that the peculiar odor of yellow wax has a preservative action upon it, and that nature has supplied it with this principle in order that it may be better adapted for our use. So with olive oil. Its odor, I am inclined to believe, has a preservative effect upon it. We have two other familiar instances of the power of odoriferous principles in preserving fatty substances, namely, pomade divine and benzoated zinc ointment.

The next experiment was commenced on the 7th of October, 1858, and consisted in filling these two bottles with fresh olive oil from the same jar, and corking them securely. One of them, marked No. 1, was placed outside a window on the south

side of my house. It has there been exposed to all the changes of temperature and the action of the sun until the present time, in order to test the power of light upon it as a bleaching agent. The result, as you see, is, that it is not bleached; it is almost as yellow as that contained in the bottle marked No. 2, which has ever since been carefully kept from the light. Therefore, it is clear that light alone will not always bleach olive oil, and I am informed that at Horner's they even occasionally meet with samples of castor oil which will not bleach after exposure to the sun for years. This being the case, we cannot depend upon obtaining bleached olive oil which has not been oxidized; for all the processes, such as treating with animal charcoal, fuller's earth, magnesia, chlorine, &c., are processes of oxidation, and must end in rancidity.

The results of these simple experiments show us very clearly, that it is not the thing to use bleached oil and wax in the preparation of ointments. Whatever might be said to the contrary, by ingenious special pleading, the framers of the Pharmacopœia never could have intended that bleached oil should be used in the making of spermaceti ointment; and I trust those of our members who have acquired the habit of using bleached oil or lard in this preparation, will discontinue the practice, as it is most desirable that uniformity should be the rule.—*Lon. Pharm. Journ., January, 1861.*

ON SOME OF THE APPLICATIONS OF GLYCERINE.

I will now proceed to describe the new process for obtaining and purifying glycerine, and may remark that the road by which we arrived at pure glycerine was a rather circuitous one. Our first step was to do away with the lime process of saponification, and with it our only source of impure glycerine. By our first improvement in separating the fat acids from neutral fats, the glycerine was decomposed by the direct action of concentrated sulphuric acid at a high temperature; and all that remained of it was a charred precipitate. A new process* for decomposing

[* It is sometimes difficult to act ingenuously in stating historical facts even in chemistry. Most of the credit of Mr. Wilson's process for distilled glycerine, is due to Mr. R. B. Tilghman of this city, whose patent

neutral fats by water under great pressure coming under our notice, led us to look again more closely into our old distilling processes; and the doing this showed, what we had often been on the brink of discovering, that glycerine might be distilled.

In our new process the only chemical agents employed for decomposing the neutral fat, and separating its glycerine, are steam and heat; and the only agents used in purifying the glycerine thus obtained are heat and steam: thus all trouble from earthy salts or lead is escaped.

Distillation, however, purifies the impure glycerine of the old sources.

Steam, at a temperature of from 550° to 600° Fah., is introduced into a distillatory apparatus, containing a quantity of palm oil. The fatty acids take up their equivalents of water, and the glycerine takes up its equivalent; they then distil over together. In the receiver, the condensed glycerine, from its higher specific gravity, sinks below the fat acids. Sufficient steam must be supplied, and the temperature regulated, otherwise the elements of the glycerine do not take up their equivalent of water, and acroleine is evolved,—a body of a very different character, an acrid eye-inflaming vapor, appreciated only by those who have had the misfortune of an experimental acquaintance with it.

In an ordinary apparatus the glycerine distilled from the neutral fat is not in a sufficiently concentrated state for most purposes: it should therefore be concentrated, and, if discolored, be redistilled. It is then obtained of sp. gr. 1.240, and contains 94 per cent. of anhydrous glycerine. It can be concentrated to sp. gr. 1.260, or to contain 98 per cent.

Mr. Wilson then described attempts which had been made to

process is alluded to by the author, and who sold his patent to Price's Candle Company, where Mr. Wilson is engaged. To Mr. Tilghman is due the credit of discovering that the exposure of fats and water to a temperature above 500° resolved them into hydrated acids and glycerine, and Mr. Wilson extended this idea to the application of the water as super-heated steam, and thus arrived at the result of the volatility of glycerine without decomposition when aided by watery vapor in the absence of atmospheric air. Why did not Mr. Wilson mention Mr. Tilghman?—*Editor Am. Journ. Pharm.*]

apply pure glycerine in some pharmaceutical preparations. Among the most important of these was its introduction into the *Mistura Ferri Composita*, of the Pharmacopœia, for the purpose of preserving the protocarbonate of iron from change. In the Pharmacopœia formula, sugar is ordered, from the well-known property it possesses of arresting the conversion of the protosalts of iron into persalts. Mr. Wilson says, in experimenting with pure distilled glycerine, it was found to possess this property of sugar in a marked degree, together with another—that of dissolving the carbonate of iron immediately on its formation, yielding a deep green solution, which remains unchanged after long exposure to light and air. A concentrated *Mistura Ferri Composita*, eight times the strength of the Pharmacopœia preparation, may be made by dissolving the carbonate of potash and protosulphate of iron in separate portions of glycerine, and mixing the solutions. At the moment of mixture, the protocarbonate of iron formed is dissolved, forming a bright green solution. This may be diluted with water, and the powdered myrrh added when required. The carbonate of iron separates on dilution as a flocculent precipitate.

Glycerine was also tried as a substitute for sugar syrup of iodide of iron, but here it did not appear to answer as well as sugar.

Among other applications that were suggested, were the following :—

Solution of ammonio-citrate of iron in glycerine, in the proportion of eight grains to the fluid drachm.

Solution of citrate of iron and quinine, in the proportion of two grains to the fluid drachm.

Solution of disulphate of quinine, two grains to the fluid drachm, no addition of acid being required.

Solution of the alkaloid quinine, in the proportion of one grain to the drachm.

Solution of tannin, eight grains to the drachm, the tannin being thus preserved from the decomposition which occurs in aqueous solutions.

It was suggested that essences of senna and rhubarb, eight times the strength of the Pharmacopœia infusions, might with advantage be made with glycerine, the latter masking the taste

of the medicines, and thus facilitating their administration to children, while the absence of spirit would give an advantage to these and other similarly prepared essences over those now generally used.

Glycerine was also recommended for preparing essences of cloves, cinnamon, lemon, &c.; also for syrup of phosphate of iron, bromide of iron, and iodide of quinine. It had been found useful for preserving fresh lemon juice, and for preserving the soft consistence of pill masses and confections.

Mr. Waugh did not see much advantage in the use of the proposed concentrated *Mistura Ferri Composita*, unless it could be shown that after diluting the concentrated solution and adding the other ingredients of the mixture, it would keep better than that made in the usual way.

Mr. Hills said he had found glycerine a very good solvent of arsenious acid, which it dissolves to the extent of a drachm to a fluid ounce.

Mr. Brady said such a solution had been tried for preserving animal and vegetable substances from decay, but it was found that fungi grew in the solution very rapidly.

Mr. Haselden described the results of some experiments he had made with reference to the solvent and preservative power of glycerine. Gallic acid was freely soluble in it, so also was aloes and some resinous substances, but not the pure resin of scammony. It promoted the solution of borax in tincture of myrrh, no water being required. When added to tincture of kino, it prevented the gelatinization of the tincture, which otherwise frequently occurred. The vegetable extracts were soluble in glycerine, and some of them, such as belladonna, when thus dissolved, formed useful preparations for external application. When used as a solvent, it was often important to have the glycerine in its greatest state of concentration. He had generally employed Price's glycerine concentrated by Smith. This concentrated glycerine dissolved twice as much quinine as that which was not concentrated.

Mr. Barnes had kept iodide of iron in glycerine without change for years, by using the best concentrated glycerine.

Mr. Squire said that some time ago a preparation, called

Plasma, consisting of glycerine and starch, was proposed as a medium for external applications, in the place of ointments. His experience of this preparation had been, that it became mouldy after being kept for some time.—*Trans. Pharm. Society*, Dec. 5, 1860.

ON A NEW ALKALI-METAL.

By MM, BUNSEN and KIRCHHOFF.

In a recent number of the *Philosophical Magazine* there is given an account of some researches by MM. Bunsen and Kirchhoff on the effect produced by various metals on the spectrum of a flame in which their chlorides are volatilised. That part of their investigation which is more particularly interesting consists of a method of photochemical analysis of exquisite delicacy, which the authors have specially studied in relation to the alkali-metals.

These metals have been employed in the form of chlorides, which have been purified with the greatest care. When these are introduced into a jet of flame they volatilise to a greater or less extent, and then communicate to the flame the special character above alluded to, and which is observable when the spectrum produced by the flame is examined by a sufficient magnifying power.

The above named memoir is accompanied by a color plate which illustrates the spectra of the alkali-metals with their characteristic rays. These rays are the more visible in proportion as the flame is less luminous and its temperature higher. The ordinary Bunsen gas-burner answers admirably for these experiments. The rays shown by the chlorides of potassium, sodium, and lithium are perfectly well defined; those of barium, strontium, and calcium are more complicated, and require a somewhat experienced eye for their identification. They are, however, quite distinct enough to be easily recognised, even when salts of these metals are mixed together; for the great advantage of this method of analysis is, that foreign matters have no influence on the results, the authors being able to detect with certainty the different elements in a mixture containing the tenth of a milligramme of the metals mentioned above. Sodium, with

its yellow ray, first appears; after that the well-defined red ray of lithium; next is seen the paler rays indicating potassium; and, after these rays have disappeared, they are replaced by those of calcium and strontium, which remain visible for some time. The absence of one or other of these sets of rays shows the absence of the corresponding metals.

We are, then, by this method placed in possession of an analytical process of the most extraordinary delicacy. The researches of our authors prove that this sensibility almost approaches the infinite, the eye being able, by its means, to recognise the presence of the $\frac{1}{3000000}$ part of a milligramme of chloride of sodium. It must not, therefore, be a matter of surprise to find sodium distributed almost everywhere, especially in the atmosphere, in which is almost always a sufficient quantity to show the sodium ray. The same may be said in great measure of lithium. In a room of a capacity of about 60 cubic mètres was exploded a mixture of sugar of milk and chlorate of potassa, containing 9 milligrammes of carbonate of lithia. The lamp, being placed at some distance off, became quickly colored, so that the red ray could be distinctly visible in the spectrum. The authors estimated that this sensibility reached the nine millionth part of the amount taken.

After this it must not be a matter of surprise to find that lithium is one of the widest spread elements. The water of the Atlantic was found to contain it. It was also found in the ashes of plants grown on a granite soil, in the vine, in tobacco, and also in milk and in human blood. In the mother-liquors of tartaric acid manufactories the lithia is found to be so concentrated as to be worth commercial extraction; and the same may be said of certain mother-liquors of saline springs.

With so delicate a reaction as the one just described, of an almost infinite sensibility, and applicable to all metals, the presence of elements, existing in so small quantities as to entirely escape ordinary analysis, may be rendered visible. Many observations tended to this point, and MM. Bunsen and Kirchhoff now announce definitely (*Annal. der Physik und Chemie*) that they have discovered a new alkali-metal, the fourth member of the group of potassium, sodium, and lithium. At present they have only found it in very small quantities in the mineral water

of Kreuznach, in the saline water of Dureckeim, and in one of the sources of the Bade—the Umgemach.

The chloride of the new metal differs from those of sodium and lithium by the yellow precipitate which it produces in the presence of bichloride of platinum. It is distinguished from potassium by its nitrate being soluble in alcohol. Introduced into a flame, and examined with a prism, the vapours of the new chloride show a very interesting spectrum, consisting of two blue lines, one of which, the fainter, almost corresponds with the blue of strontium; the other, also a well defined blue line, is situated a little further towards the violet extremity of the spectrum, and rivals the lithium line in brightness and distinctness of outline.—*Chem. News*, Nov. 24, 1860.

VOLUMETRIC ESTIMATION OF TANNIN.

Müller prepares a standard solution by dissolving 18 grammes of gelatine and $2\frac{1}{2}$ grammes of alum in 320 centimètres of water. 31 cubic centimètres of this solution precipitate 1 gramme of tannin. To extract the tannin he powders the substance containing it, places the powder in a flask, and adds sufficient hot water to cover it. He then boils for a few minutes, and decants the liquor carefully into a precipitating glass. This operation is repeated five or six times, with more water, and at last powder and all are poured into the glass. The presence of the powder does not interfere with the precipitation of the tannin, but even favors the clarification of the liquor. After cooling, the standard solution is added as long as a whitish cloud is formed in the clear liquid.—*Chem. News*, Nov. 1860.

CLEANING OF PLATINUM.

To the Editor of the Chemical News.

SIR,—A remarkably rapid and perfect method of cleaning platinum apparatus consists in gently rubbing upon the dirty metal a small lump of sodium-amalgam. Sodium has the curious property of lending to mercury the power of “wetting” platinum in so complete a manner that the positive capillarity between platinum and an amalgam containing even only a few

per cent. of sodium appears to be as great as that between mercury and zinc, with this important difference, however,—in the former case the “wetted” metal does not suffer the least trace of amalgamation. Even when foreign metals, such as lead, tin, zinc, silver, are purposely added to the sodium-amalgam, the platinum surface suffers no disintegration.

When the amalgam has been rubbed on with a cloth, until the whole surface is brilliantly metallic, water is applied, which oxidises the sodium and allows the cohesion of the mercury to assert itself. On wiping the mercury off, the platinum surface is left in admirable condition for the burnisher. I suppose the sodium to act here chiefly as a diluent, diminishing thereby the cohesion of the mercury and allowing the adhesion between that metal and the platinum to predominate,—a result which is certainly assisted by the mercury enabling the sodium to offer a clean surface to the platinum, and so allowing the specific adhesion between the two latter metals to be exhibited.

I am, &c.

F. G.

Laboratory, University of Edinburgh.

—*Chem. News*, Nov. 1860.

ON THE ORIGIN OF FERMENTS.

BY M. L. PASTEUR.

Among the questions arising during the researches which I have undertaken on the subject of fermentations, properly so termed, there is none more worthy of attention than that which relates to the origin of “*ferments*.” Whence proceed these mysterious agents, so feeble in appearance, and yet in reality so powerful; which in the minutest quantity, measured by weight, and with insignificant external chemical characters, possess such extraordinary energy? It is in an attempt to solve this problem that I have been led to the study of the so-called spontaneous generation.

In the communication which I had the honor of submitting to the Academy on the 6th of February last, I mentioned only a single fluid appropriate for the development of Infusoria and Mucedinea, although I gave a general method applicable to all liquids.

On that occasion I showed, in a manner that has been contested only in appearance—First, that the solid particles conveyed in the atmospheric air were the origin of all the vegetable and animal productions peculiar to the fluid in question. Secondly, that these particles, examined under the microscope, are amorphous, dusty atoms, constantly associated with certain corpuscles, whose form, volume and structure show that they are organized after the manner of the ova of Infusoria or of the spores of the Mucedinea.

I am, at present, in a condition to extend the assertions contained in the communication of the 6th February to two substances, still more alterable than the sugared water mixed with albuminous matters which had been more particularly the subject of my former experiments. I now speak of “milk” and “urine.” The details of the results derived from these two fluids will show, as I hope, the kind of future in store for this department of study.

I introduce about 100 cubic centimeters of recent urine into a flask capable of containing 250 cubic centimeters. The drawn-out neck of the flask communicates with a platinum tube, heated to redness. The liquid is made to boil for two or three minutes, and then allowed to cool. When refilled with air, which has been subjected to a red heat, the flask is hermetically closed.

The flask, under these conditions, may remain for an indefinite time in a stove, at a temperature of 30° C., without its undergoing any alteration. After the lapse of a month or six weeks, I cause a small quantity of amianthus charged with the atmospheric dust to fall into the flask, the mode in which this is effected being precisely that described in the *Comptes Rendus* of the 6th of February. The neck of the flask being then again hermetically closed, the apparatus is replaced in the stove.

In order to be sure that the manipulation to which the flask is submitted, for the introduction of the atmospheric dust, does not itself in any way affect the result of the experiment, I prepare a second flask similar to the other; only that, instead of allowing amianthus charged with atmospheric dust to fall into it, I substitute the same amianthus previously calcined for some moments before its introduction into the flask.

The following are the constant results of the experiments so made.

The fluid in the flask which has received the amianthus deprived of the atmospheric dust remains unaltered at the temperature of 30° C., whatever may be the duration of its exposure to this heat, which is so favorable to the putrefaction of urine. On the contrary, at the end of six hours, the urine which has received the atmospheric dust, presents organized products—Mucedinea or Infusoria. Among the latter I have noticed chiefly *Bacteria*, very minute, *Vibriones*, and *Monads*, in fact, the same Infusoria that I have found in the same urine exposed to the contact of the atmospheric air at a temperature of 30° C. During the following days will be witnessed an abundant deposition of crystals of ammoniaco-magnesian phosphates and of the alkaline lithates. The urine becomes more and more ammoniacal. Its urea disappears under the influence of the true ferment of the urine, a ferment which I have proved to be organized, and whose germ could only have been introduced in the atmospheric dust, as well as that of the Infusoria or of the Mucedinea.

Milk exhibits still more interesting properties. I have said that, before filling the flask with air which has been subjected to a red heat, and hermetically closing it, I caused the urine to boil for two or three minutes. This duration of the ebullition is sufficient, and everything leads me to believe that even less careful precautions will suffice to deprive of all viability the germs which may have fallen into the urine subsequent to its emission.

This being granted, let us repeat, without any change, the operation above described—now, however, not upon urine, but upon fresh milk; that is to say, after this fluid has been boiled for two or three minutes, and the flask has been refilled with air heated to redness, let us keep it closed at a temperature of 30° C.

After a variable lapse of time—generally of three to ten days—the milk in all the flasks thus prepared will be found coagulated. Under the prevalent views respecting the phenomenon of the coagulation of milk, there is nothing in this circumstance to excite surprise. When milk, it is said, is exposed

to contact with the oxygen of the air, the albuminous element is altered and acts as a ferment. This ferment reacts upon the sugar of the milk, and transforms it into lactic acid, which then precipitates the casein. This is the cause of the coagulation. In reality, however, things are quite otherwise. For if one of these flasks in which the milk is coagulated be opened, it is obvious, on the one hand, that the milk is *as alkaline as fresh milk*; and on the other—a circumstance tending to encourage the belief in spontaneous generation—that the milk is filled with Infusoria, most frequently with *Vibrios*, as much as $\frac{1}{20}$ th millimeter in length. As yet I have not met with any vegetable production under these circumstances.

From these facts we must admit—First, that the phenomenon of the coagulation of milk, as I hope shortly to demonstrate more clearly, is a phenomenon upon which we have had but very imperfect notions. Second, that *Vibrios* may arise in a liquid of the nature of milk which has undergone ebullition for several minutes at a temperature of 100° C., although this is not the case with respect to urine, nor to a mixture of sugar, water and albumen. Is it the case, then, that under particular conditions we may have spontaneous generation? We shall soon see how far this conclusion would be erroneous. Let the milk be boiled, not for two, but for three, four, or five minutes, and it will be found that the number of flasks in which it coagulates from the presence of Infusoria diminishes progressively in proportion to the longer duration of the ebullition. And lastly, if the ebullition be carried on at a temperature of 110 to 112 degrees, under the pressure of $1\frac{1}{2}$ atmosphere, the milk will never afford any Infusoria. Consequently, as they do arise under the conditions existing in the former experiments, this is evidently due to the circumstance that the fecundity of the germs of the *Vibrios* is not entirely destroyed, *even in water* at a temperature of 100° , kept up for some minutes, and that it is more affected by a longer ebullition at that temperature, and wholly abolished at the temperature of 110° to 112° C.

But what is to be said concerning the phenomenon of the coagulation under those special conditions of ebullition, in which the milk in contact with calcined air never affords any Infusoria? One remarkable fact is, that the *milk does not*

coagulate. It remains alkaline, and preserves, I would venture to say, entirely all the properties of fresh milk. Then if, into this milk, thus retaining its integrity, the atmospheric dusty particles are introduced, it changes and coagulates, and the microscope shows the existence in it of divers animal and vegetable productions.

It would be very interesting to ascertain whether the fluids belonging to the animal economy, such as milk and urine, contain normally or accidentally, previously to all contact with the common air, the germs of organized productions. This is a question which I hope to resolve in a subsequent communication.

The generally admitted theory of ferments, and that which of late years had received fresh support from the writings or the labors of various chemists, consequently appears to be more and more incongruous with experiment. The "ferment" is not a dead substance, without determinate specific properties. It is a being, whose germ is derived from air. It is not an albuminous substance, altered by oxygen. The presence of albuminous matters is an indispensable condition of all fermentation, because the "ferment" depends upon them for its life. They are indispensable in the light of an aliment to the ferment. The contact of the atmospheric air is, primarily equally an indispensable condition of fermentation, but it is so in virtue of its being a vehicle of the germs of the "ferments."

What is the true nature of these germs? Do they not require oxygen, in order to pass from the state of germs to that of adult ferments, such as are not met with in the products undergoing fermentation? I have not yet arrived at any fixed conclusion with respect to these grave questions. I am endeavoring to pursue the inquiry with all the attention it merits; but the really capital difficulty of these studies consists in the isolated, individual protection of the various ferments. I may assert that there are a great many distinct, organized ferments, which excite chemical transformations, varying according to the nature and organization of the ferment. But in most cases the nutriment suitable to some, allows of the development of others of them, whence arise the most complicated and the most variable phenomena. If we could only isolate one of these ferments, in

order to develop it by itself, the chemical transformation corresponding to it would take place with remarkable precision and simplicity.

I shall, in a short time, give a new instance of this, in describing the organized ferment proper to the fermentation termed "viscous."--*Lond. Pharm. Journ. from Compt. Rend. Mai, 1860.*

ON THE ACTION OF VARIOUS REAGENTS UPON IODIDE OF POTASSIUM.

By G. UBALDINI.

When nitrate of ammonia and neutral iodide of potassium are intimately mixed at the ordinary temperature and in contact with the air, the mass acquires a yellow color, and starch-paste, which acquires a blue tint, indicates free iodine in the mixture. The boracic acid of commerce acts in the same way. These two reagents acting upon a concentrated solution of iodide of potassium at the temperature of ebullition, set free iodine.

By the action of contact aided by heat, operating with dry substances in a glass tube closed at one end, iodide of potassium is decomposed with evolution of violet vapors of iodine, not only by nitrate of ammonia and boracic acid, but also by sulphate, oxalate, carbonate, and muriate of ammonia, by phosphorus salt, sulphate, phosphate, nitrate and borate of soda, chloride of sodium, chlorides of potassium and calcium, sulphates of potash and magnesia, nitrate of lime and silicic acid.

The decomposition of iodide of potassium by the above mentioned substances, does not always take place at the same temperature; thus whilst silicic acid only decomposes the iodide at the temperature of fusion of glass, boracic acid, chloride of sodium, nitrate of ammonia, and nitrate of soda cause the evolution of the violet vapors at a low temperature. Oxalate of ammonia decomposes the iodide when it begins to decompose itself; carbonate and muriate of ammonia, when gently heated with iodide of potassium, fuse with it, forming a yellow liquid which evolves vapors of iodine in contact with the air; lastly, phosphorus salt, nitrate of lime, chloride of calcium, sulphate of ammonia, sulphate of magnesia, and sulphate, phosphate and

borate of soda, decompose iodide of potassium at a high temperature, and the violet vapors only make their appearance at nearly a red heat.

Sulphate, phosphate and carbonate of lime, by the action of heat and air, partially decompose iodide of potassium; but bin-oxide of manganese, by the simple action of heat, eliminates all the iodine of the iodide.

Carbonate and nitrate of potash, and carbonate of soda have no decomposing action upon iodide of potassium.

Cantu announced the decomposition of iodide of potassium at a high temperature in a current of dry nitrogen, but this experiment repeated several times, never furnished the least evolution of violet vapors.—*Chemical Gazette, from Comptes Rendus*, August 22, 1859.

ON THE HUMOID CONSTITUENTS OF THE CINCHONA BARKS.

By O. HESSE.

In the investigation of the Huanoco Cinchona bark, Reichel found a brown matter, the properties of which differed from those of humic acid of peat, and to which he gave the name of lignoine.

Analyses of lignoine dried at 212° F., made by Hesse, gave

C	59.4	59.2	40	59.25
H	6.1	5.6	23	5.67
N	3.5	..	1	3.47
O	..	..	16	..

Lignoine, $C^{40}H^{23}NO^{16}$, dissolves very readily in alkaline carbonates, and these solutions absorb no oxygen; in other respects it differs but little from the humoid substances.

The nitrogen expressed in the preceding analysis is contained in the form of ammonia, which is set free by boiling with caustic potash, when a body of the composition $C^{40}H^{20}O^{16}$ is obtained. This body, therefore, is distinguished by its composition from the humoid bodies of vegetable mould and peat, as it contains four atoms of hydrogen more than of oxygen.

The Chinova-red prepared by Hlasiwetz has the same com-

position as the substance when free from ammonia. In this Hlasiwetz found

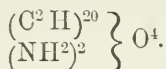
C	61.10	61.32
H	5.05	5.26

Phlobaphene also belongs here. For this body the formula $C^{20}H^{10}O^8$ was lately proposed. Reichel also obtained from red Cinchona bark a brown matter (which he calls a lignoine-like body) containing

C	61.15
H	4.65(?)

The latter substance, however, contains some ammonia, as appears from Reichel's further experiments.

It consequently appears that a brown humoid matter of the same composition is deposited in the Cinchona barks, which may be expressed by the formula $C^{40}H^{20}O^{16}$. It is essentially distinct from the China-red of Schwarz, and not to be classed with this, as has been done by Gerhardt. It is, however, remarkable, that in this humoid matter we again meet with the group $C^{20}H^{10}$, which makes its appearance if we attribute to quinine the formula

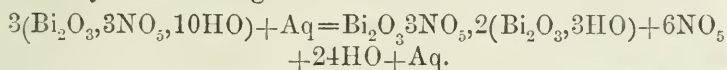


London Chem. Gaz. from Liebig's Annalen. cix.

PREPARATION OF SUBNITRATE OF BISMUTH.

MM. Bechamp and C. St. Pierre recommend the following method of making subnitrate of bismuth (*Montpelier Medical*, April, 1860.) They first make a neutral nitrate, by pouring nitric acid on powdered bismuth. The crystals of this neutral salt are drained, and then washed with a mixture of 1 part of acid and 3 of water. They are then dissolved in as small a quantity as possible; and the experiments of the authors have shown that a cubic centimetre of water, at 80° , containing 10 per cent of nitric acid, is sufficient to dissolve 1 gramme of the salt. $12\frac{1}{2}$ parts of water, are now sufficient to precipitate a part

of the crystallized nitrate so dissolved. The reaction is represented by the following formula :—



10 grammes of the crystallized nitrate should yield 6·3 grammes of the subnitrate, but only two-thirds of this quantity are obtained. The rest of the bismuth, which remains in the mother liquors in the state of subnitrate, and not as oxide, may be precipitated by carbonate of ammonia. The salt precipitated by water, gives, on analysis, 16·08 of nitric acid, and 76·8 of oxide of bismuth. That precipitated by ammonia contains 80 per cent. of oxide of bismuth. The two products differ slightly. The second, when too much ammonia has not been used, has an evident crystalline texture, a faintly acid taste, and reddens litmus. The first is crystallized, and is slightly soluble in water; it reddens litmus strongly and has a decided acid taste. The authors add, that all subnitrate of bismuth should be rejected which is in the form of an amorphous powder, is without taste, and does not act on litmus. M. St. Pierre recommends that, to free bismuth from arsenic, from 2·5 to 5 per cent. zinc should be added, and the whole heated strongly for an hour, a piece of charcoal being placed in the crucible to prevent the oxidation of the zinc. After this treatment the bismuth will contain neither arsenic nor zinc.—*Chem. News, London, Jan. 15th, 1861.*

NEW CINCHONA ALKALOID.

Schwabe (*Archiv der Pharmacie*, bd. cii. s. 273) has extracted from quinoidine a new alkaloid which he calls β -cinchonine. To obtain it, quinoidine is dissolved in dilute hydrochloric acid, then precipitated with ammonia; the precipitate is washed first with cold, then with hot water; afterwards dried and subsequently treated with cold alcohol, which in about twenty-four hours gives a brown tincture. The residue is exhausted successively with alcohol and then with water, and afterwards dissolved in dilute sulphuric acid. This solution is warmed, and, while hot, a solution of carbonate of soda is added until a crystalline pellicle forms. It is then set aside to cool, whereupon crystals of

the sulphate of *beta-cinchonine* are deposited. These are a little colored, but may be purified in the usual way. By dissolving the sulphate in acidulated water, precipitating by ammonia, and crystallizing from alcohol, the pure alkaloid is obtained in right rhombic prisms.

Beta-cinchonine $C_{20}H_{12}NO$ is anhydrous, and fuses at $150^{\circ} C$; on cooling it becomes a radiated mass; it is not volatile, and burns with a smoky flame. It is easily distinguished from the other cinchona alkaloids by its crystalline form, chemical properties, and particularly by its solubility.

The author gives the following table of the solubility of the cinchona alkaloids in different menstrua:—

	α Quinine.	β Quinine.	α Cinchonine.	β Cinchonine.
Cold water	400 parts	15,000	insoluble	insoluble.
Boiling water	200 "	750	2500	slightly sol.
Cold alcohol	2 "	45		173
Boiling alcohol	2 "	3.7	30	43
Ether	60 "	90	insoluble	378
Chloroform	6 "		40	268

Fatty oils dissolve beta-cinchonine. The alcoholic solution turns the plane of polarization to the right. The following are the chemical reactions of salts of the new alkaloid:—Chloride of gold gives a sulphur yellow precipitate; bichloride of mercury gives a white precipitate, which soon becomes resinous; bichloride of platinum an orange yellow precipitate soluble in much water; iodated water a red brown bromated alcohol a yellow precipitate; picric and phospho-molybdic acids a yellow precipitate. With chlorine and ammonia the solution becomes yellow. Gallic acid gives a yellowish white precipitate; and prussiate of potash gives a rose coloration, as with the solutions of quinine, cinchonine, and quinoidine. The author has not succeeded in obtaining neutral salts with beta-cinchonine; all are basic. The sulphate crystallizes in prisms with a rhombic base; it is insoluble in ether, but soluble in alcohol and water. The hydrochlorate crystallizes with 4 equivalents of water in prisms which are slightly soluble in ether. With bichloride of mercury they form an amorphous double salt. With bichloride of platinum they form six-sided rhomboidal prisms. Iodine gives with the sul-

phate a salt resembling the compound obtained with iodine and sulphate of quinine. It is made by dissolving (at 30° C.) 10 parts of the sulphate in a mixture of 144 parts of acetic, and 12 parts of dilute sulphuric acid, to which is added 3 parts of iodine dissolved in 115 parts of alcohol. On cooling, plates without definite form separate from the solution.—*Chem. News, London, Jan. 5th, 1861.*

NOTE ON MONOHYDRATED SULPHURIC ACID,

BY DR. LYON PLAYFAIR.

At the meeting of the Royal Society of Edinburgh, on the 7th instant, Dr. Playfair drew attention to the researches of Marignac on sulphuric acid. This chemist always found too much water in monohydrated sulphuric acid, and fixed its specific gravity, as Beneau and others have recently done, from 1.842 to 1.845.

It is well known, indeed, that this hydrate loses anhydrous acid when distilled or boiled, and the object of the present communication is to ascertain the exact conditions under which this loss takes place, as this knowledge is of importance in a practical point of view.

The author occasionally found on distilling, and afterwards heating, oil of vitriol, that acid of the specific gravity of 1.848 was obtained, but at other times the specific gravity was as low as 1.842. To explain this difference, the following experiments were made:—

1. Sulphuric acid, having a specific gravity of 1.848, and a per centage of anhydrids of 81.62 by the alkalimeter, was put in a retort, buried in hot sand, and distilled. The distillate had a specific gravity of 1.840, and a per centage strength of 80.12. It had, therefore, lost by distillation $1\frac{1}{2}$ per cent. of anhydrids.

2. The weak acid got by the last experiment was heated for half-an-hour to 550° F., and, after cooling, gave an acid of 1.84793 specific gravity, and strength of 81.615 anhydrids.

3. A portion of this acid now restored to its full strength and specific gravity, was violently boiled for two hours. On testing

the acid on cooling, it was reduced in strength to 80.01 of anhydrids, and to a specific gravity of 1.838.

4. The weak acid obtained in the last experiment was kept for one hour at 550° F. On cooling, it had increased to 81.62 per cent. of anhydrids, and the specific gravity was 1.84792.

As a general result of these experiments, it follows that the old specific gravity of 1.848 is more correct than that given by Beneau and Marignac; that there is a true monohydrate of sulphuric acid which loses anhydride near its boiling point, but not below 550°. The latter temperature should not be exceeded in the concentration of oil of vitriol.—*Lon. Chem. News, Jan., 1861.*

SALE OF POISONS IN FRANCE.

A medical student, named Delorme, and a retired apothecary, named Boucaumont, have been tried before the French Tribunal of Commerce on the charge of homicide by imprudence. The following were the circumstances of the case:—A young girl, eighteen years of age, went astray, but after a while was seized with remorse, and determined to commit suicide. A friend remonstrated, and, as he thought, succeeded in persuading her to abandon the intention. A few days afterwards she called on Delorme, and in the course of conversation took up a phial containing an arsenical compound. “Do not touch that,” he said “it is poison.” “I am not afraid of poison,” she replied; and from what afterwards transpired, she appears to have secreted the phial, and went away. Two days later she committed suicide by means of this poison. The phial having been traced to Delorme, he was arrested and tried for his imprudence in allowing the girl to obtain the poison, and Boucaumont for supplying the poison, contrary to the regulations in force. The defence on the former was, that he did not know that the girl had taken the phial, and of the latter, that it was supplied with the understanding that it was required for experiments. The tribunal condemned each to three months’ imprisonment, with the addition of a fine of 50f. in the case of the apothecary.—*Lon. Pharm. Jour.*

[Continued from page 88.]

plant which produces it. We know infinitely more of the cinchona-tree and other exotic plants than of the lime and nut trees of our own woods. If all chemists were to occupy themselves with the analyses of plants, after several centuries there would be still materials enough growing before their eyes to employ hundreds of hands with their chemical investigation.

The investigations which spread the most light are those which enable us to learn the composition of the individual parts of a plant at different periods of its growth, and at different epochs of its development. The material for such investigations can scarcely be procured at a distance, so we are constrained to examine that which lies near us, and not to seek afar off that which is better and easier obtained at home.

With regard to the quantity of material required for the investigation, no certain weight or measure as a minimum can be fixed. But it is better in all cases to employ too much, rather than too little, material. With materials which cannot be procured in any required or unlimited quantity, it is better to commence no analysis. Through a scarcity of material the operator is constrained to terminate the research, unable to complete it, and has time and money uselessly spent, or he arrives at incorrect results, when, from a failure of the material, he is unable to undertake a number of control experiments. It is on that account that the results of analyses which, as frequently happens, were undertaken with a few ounces of the material, seldom possess any value. In the best instances of such analyses some constituents were overlooked which were present in small quantities in the material. Many incorrect statements are made in such analyses because an insufficient number of methods of separation were employed. Mixtures of bodies are regarded as new substances, and are long carried on as the ballast of science, until later analyses prove their non-existence. Substances which are widely different from one another are confounded with each other, because an insufficiency of material was employed to prepare enough of the constituent to establish its composition in the pure state. Thus, one chemist finds tartaric acid, when another is stated to have found oxalic acid, and a third seeks unsuccessfully for tartaric acid, and finds instead citric acid. If we could previously determine the quantity of material, it would often be useful, but such a previous determination is impossible. The operator can easily ascertain how much water or dry substance a material contains; and when it is very rich in water, concludes therefrom that he will require proportionately more of it than from one poor in water under other similar conditions. But from the abundance of dry substance, no conclusion can be drawn as to the quantity which will be required for the investigation. Many parts of plants contain large quantities of cellulose, starch, and other ordinary constituents, which may be readily detected, but little of the remaining constituents. Frequently all the constituents are present in rather considerable quantities, so that the investigation can be terminated with a little material, unless one constituent is present in very small quantity. In such a case a

very great mass of material must be operated upon to obtain the constituent which is present in small quantity, because from a smaller quantity of the material we cannot obtain enough to arrive at a conclusion upon its nature by a suitable research. If we abstract from the weight of a substance under examination the weight of water which it contains, also that of the inorganic constituents and the weight of cellulose which remains after the material has been treated with ether, alcohol, water, diluted acids, and alkalies, we obtain an inconsiderable residue, which represents all the other bodies together present, except the cellulose, water, and inorganic constituents. As a general rule, we seldom find more than 300 grains of these bodies in from 3 lbs. to 5 lbs. of the crude material, which must be subjected to a close investigation if we would arrive at a correct view of their true nature. From this general estimate, it will be seen that 5 lbs. of crude material is a quantity that scarcely is sufficient at any time for the completion of an analysis. The least quantity of material is required in those cases where the known, easily recognized constituents are in the smaller quantity, and the unknown ones, on the contrary, are in the greater quantity.

SECTION 3.—*Treatment of materials with various solvents.*

The material mechanically prepared for the investigation should be divided into several parts, and each part treated with a solvent to obtain a number of extracts, which are to be submitted to a further examination.

The fluids most frequently used for a long time for this purpose are ether, alcohol, and water; the latter is often mixed with acids or alkalies. The ether is generally used in a perfectly pure condition, the alcohol mixed with more or less water, according to the strength of the spirit required. Experience has shown that water, after it has extracted bodies from a material which are quite soluble in water, also possesses the power of dissolving substances, as already mentioned, which are either insoluble, or difficultly soluble *per se* therein. This disadvantageous circumstance occurs less with alcohol, and still less with ether. In consequence, it has become a general rule to treat the material first with ether, then with alcohol, and lastly with water, when it is intended to treat it with these three solvents. I have found it the most convenient to extract a portion of the material with hot water, another portion with cold water, a third portion with acidulated water, a fourth portion with ammoniacal water, a fifth portion with alcohol, and to treat a sixth portion with ether. In peculiar cases, a treatment with alcohol containing ammonia or potash is suitable. The preparation of these solutions, as well as the precautions to be therein observed, will here be more minutely discussed.

I.—*Treatment of the substance under examination with boiling water.*

The treatment with boiling water, as previously stated, should afford us a decoction and a distillate, of which the former will contain the non-volatile constituents and the non-volatile compounds of the volatile bodies in

so far as they are soluble in water, the latter the volatile, or rather the constituents, distillable with water, of the material. For the treatment of the material under examination with water, an ordinary still is required. The still, which must be sufficiently capacious, is filled with the water intended for the extraction of the material, and this is heated to the boiling point. When the water boils, the material suitably divided, is thrown into the water, the receiver adjusted, and proper care taken for its refrigeration. To introduce the divided material, carefully into the boiling water, and to prevent burning as much as possible, I employ an apparatus which I will in a few words here describe. This consists of a cylinder, open at the top and closed at the bottom, made of tinned iron plate. The sides and the bottom of the cylinder are perforated with holes, so that the cylinder represents a coarse sieve. Externally, at the bottom, three short feet are attached, and a cover of tinned iron plate, likewise perforated, closes the cylinder in which it is inserted, being in diameter about two lines less than the cylinder. The material is introduced into this cylinder without being pressed, and the cover is laid on. By means of twine the cover is fastened to the place where it lays. The size of the cylinder depends upon the capacity of the still. In filling the cylinder, care must be taken that the material is only in such quantity that it is covered at least three inches high by the water in the still when the cylinder is inserted in the boiler, which is done while the water boils.

When the material is thus introduced into the already boiling water, the decomposing action of ferments contained therein on the other constituents is prevented, from which decomposition products would be produced whose formation must not be permitted. We know by the treatment described that bitter almonds afford no bitter almond oil, and mustard no mustard oil. It is of importance in the investigation of the distillate to prevent the formation of volatile products from the non-volatile constituents of the material. But independently of the volatile decomposition products which could be formed when the directions mentioned are not observed, decomposition might occur which would give rise to erroneous ideas of the composition of the substance under examination in the investigation, of its watery decoction, because there are in many plants bodies, besides ferments, which are broken up into two or more non-volatile products when they are long in contact with water and ferments. This is the case when the material is placed in cold water and then heated to the boiling point, which occupies a longer time the greater the quantities of material and water that are to be raised to the boiling point. The root of the *rubia tinctorum* is an example of this kind, which contains a peculiar ferment by which ruberythric acid in the presence of a ferment is decomposed into alizarine and sugar, when the comminuted root is placed in cold water and then heated to the boiling point. On the contrary, when the divided root is introduced into boiling water, the ruberythric acid remains unchanged and

dissolves in the water, while the ferment is converted into an inactive condition.

With materials which contain easily oxidizable constituents it may be readily perceived that by the introduction of the substances into boiling water their oxidation takes place in a much smaller degree than by being immersed in cold water and subsequently heated. The decoctions which are obtained according to the method here recommended are on that account generally much paler than those produced by gradual heating.

When the substance to be extracted has been sufficiently long in contact with the boiling water, and no more volatile products can be detected in the distillate, in case such have been formed therein at the commencement of distillation, the operator, after the neck has been removed, withdraws the cylinder and its contents, places it on a capacious dish or basin to catch the droppings, and presses the material in a press between two vertical plates. The decoction is filtered, whilst hot, through paper. To prevent it cooling while being filtered, as large a number of funnels as are necessary should be employed. If, in consequence of the liquid cooling, anything should be separated by the filter which had been previously dissolved, the filtration must be performed by means of a hot water funnel. From a watery decoction of the flower-buds of *capparis spinosa*, the quercitrine, or the so-called rutinic acid, is precipitated by cooling in voluminous flocks. The distillate thus obtained is either pure water, in those cases where the substance under examination did not contain bodies distillable with the vapor of water, or such as are not in a free condition, but in the form of non-volatile compounds, or there are volatile bodies dissolved therein or suspended with others. The distillate is then either clear when the volatile substances are readily soluble in the water distilled over with them, or are present in very small quantity, or it is turbid from suspended undissolved substances which exist in the fluid either in the form of oily globules, or crystals, but seldom in the form of flocks. More frequently, when the material contains a considerable quantity of volatile substances which are not readily soluble in water, an oily film swims on the surface of the distillate, or collects at the bottom of the liquid. The volatile bodies which may be dissolved or suspended in the distillate belong often to the most different classes of bodies. Volatile bases, volatile acids, hydrocarbons, indifferent volatile oils containing oxygen, aldehydes, compound ethers, may be contained in such a distillate. It is a rare case for only one volatile substance to be found by a close examination of the distillate. If the substance under examination contains only small quantities of volatile substances, recourse must be had to cohobation. When a portion of the material has been treated in the manner directed, and a sufficient quantity of the distillate has been obtained to point out by means of a preliminary examination to what classes of bodies the volatile substances found therein belong, it may be easily determined whether cohobation is necessary or not. Assuming there were only volatile acids or volatile

bases contained in the distillate, a cohobation would be superfluous even when their quantity was very small.

The treatment of the watery decoction and the watery distillate for the purpose of ascertaining their constituents, the next section will describe.

II.—*Treatment of the material to be examined with cold water.*

A portion of the material, as finely divided as possible, is treated with cold water. As much water is employed as will thoroughly saturate the material, and cover it about a couple of lines. After a short time, the saturated mass is placed upon a fine strong piece of linen, and the liquid pressed off by a gradually increased force. The liquid thereby obtained is filtered through moist paper, in as many small filters as possible. In most cases the liquid passes slowly through the filters. By this method of treatment it is not possible to prevent the formation of decomposition products by the action of the ferment on the other constituents. As all these decompositions proceed with more difficulty in proportion to the lowness of the temperature, this disadvantage may be considerably removed by employing ice-cold water for the extraction, and by preventing the heating of the filtering liquid by surrounding the funnels with such water. The filtrates should be collected in vessels surrounded with cold water.

The further investigation of this filtered liquid will be described in the next section. It serves principally for the detection of those substances which remain undissolved by the treatment of the material with boiling water, because they become by elevated temperatures insoluble in water, that is coagulated, as is the case with bodies analogous to albumen. emulsin, &c.

III.—*Treatment of the substance to be examined with acidulated water.*

A portion of the material is treated with water, to which a little sulphuric acid has been added, and heated in a water-bath, or by a current of steam. The boiling hot fluid, together with the material previously placed therein, is allowed to cool, and the fluid is separated from the undissolved material, which is then gently expressed. This fluid serves chiefly to detect some few organic acids which are contained in the material, in the form of salts insoluble in water and alcohol, but which are set free by the sulphuric acid, and thereby become soluble in water; and also to show the presence of organic bases, which are contained in the form of sulphates in this extract.

IV.—*Treatment of the material to be examined with ammonical water.*

For the preparation of the extract with water to which a little caustic ammoniac has been added, a small quantity of the residue is taken which is obtained after boiling the material with water and expressing it. This residue is introduced into water containing ammonia, and the whole allowed to stand quietly some time, until the liquid has properly saturated the substance. After passing the liquid through linen and expressing

the substance, the liquid is filtered through paper. This fluid is suitable for the detection therein of some bodies which are soluble in alkaline liquids, but not in water or dilute acids. Only when the addition of dilute hydrochloric acid produces a precipitate in this fluid is it prepared on a larger scale for the further examination of the precipitate. When no precipitate results, it is no longer employed for the investigation.

V.—*Treatment of the material to be examined with alcohol.*

Whether alcohol containing more or less water is employed for the extraction of the material, whether the extraction should be conducted at an ordinary temperature or at a boiling heat, depends on the properties of the material to be extracted. The operator must first convince himself whether a considerable quantity of fat is present or not. It is easy to ascertain this with certainty. The extraction of a small quantity of the material with ether, and the evaporation of the ether, proves this. It may be readily observed whether the residue, after the evaporation of the ether, contains much fat or not. When the material contains only a very little fat, the alcohol should be applied boiling hot for the extraction. In this case a spirit of .825 sp. gr. should be employed. If a great quantity of the fat is present in the material, which is the case when by expression between cold or heated plates the chief bulk of the fat is separated, weaker spirit of specific gravity, between .850 and .855, must be employed, and the extraction performed at an ordinary temperature.

Should the material be treated with hot alcohol, and a large quantity be operated upon, a still is the best for this purpose which is provided with an inner receptacle for the material and the alcohol. The heat employed is that of a water-bath. When the head of the still is affixed, and proper care taken for cooling the distillate, but little alcohol is lost, because its vapor is condensed. If volatile substances exist in the material, they pass over simultaneously with the spirit. Easy as it is to separate volatile acids or bases from the spirit, it is equally difficult to remove volatile oils therefrom. Such alcohol is constantly again and again used for the extraction of a fresh quantity of the same material; in the worst cases it can be employed for combustion, &c. When the spirit has acted sufficiently long on the material to be extracted, the head of the still is removed, and the receptacle and its contents together withdrawn from the still, then the liquid is strained through linen, and the material is expressed by slowly increased pressure. The alcoholic decoction is filtered while hot through paper, and placed aside to cool, whereby frequently bodies separate which are more difficultly soluble in cold than in hot spirit. The extraction of the material with cold alcohol is conveniently performed in a bottle with a very wide mouth, which is furnished with a glass stopper well ground in. It should be of such dimensions that materials to be introduced should almost fill it when loosely inserted therein. It is better to employ several small bottles instead of one large one. Into these bottles the quantity of

material is introduced necessary to fill them, the material is covered with spirit, and the completely filled bottles closed with glass stoppers. After standing 24 or 36 hours in a moderately warm place, the spirit is poured off. As far as possible this filtered extract is preserved in a stoppered bottle quite full, and the material is treated with a fresh quantity of spirit, which is allowed to remain on the material for examination 24 hours. The extract thus obtained is employed for the extraction of a second quantity of material instead of fresh spirit. The extracted material is taken from the extracting vessel and expressed; the expressed fluid is treated in the same way as that obtained by pouring off. In this manner suitably concentrated extracts are obtained. As in Robiquet's glass apparatus for extraction a little material can only be introduced at once, and on account of the danger of its breakage when operating with hot alcohol, I use an extraction apparatus of tinned iron plate for the extraction of large quantities of the substance for examination with cold alcohol, or the extraction of smaller quantities with hot alcohol, with which it is not worth the trouble to employ a still. This apparatus is so arranged, that it permits the employment of hot or cold alcohol with equal facility. The apparatus consists of two concentric cylinders joined together, which are about eighteen inches high. The diameter of the inner cylinder is from four to five inches, and the diameter of the outer one double that size. Both cylinders are fastened together below by an horizontal ring of tinned iron plate. The inner cylinder projects about an inch below. This projection passes through a ring which is fixed to a funnel. When the funnel is fastened by its spout to a filter stand, it is only necessary to fix the funnel to the apparatus for extraction firmly in a vertical position. The inner cylinder is closed at the bottom with a finely perforated plate. The space between the two cylinders can be filled with water at any required temperature. From a flask closed with a perforated cork, through which passes a glass tube twice bent at right angles, steam is conducted into the water between the cylinders. Any required temperature can be obtained during the time of extraction by regulating the heat under the flask, and thus regulating the current of steam. To prevent the evaporation of the alcohol added to the material which fills the inner cylinder, into the hole at the bottom of which has been inserted a loose layer of cotton wool, the cylinder is closed with a tin cover, but not hermetically tight. When the space between the two cylinders has been filled with hot water, it is closed with a circular cover, which has a perforation to admit the steam tube to the water. It is evident that this tube must reach nearly to the bottom of the vessel. To be able to empty the water conveniently which is placed between the cylinders, a small cork is attached to the external cylinder at the bottom of its outer edge. When the extraction is conducted in this apparatus, the alcoholic extract passing through the material is poured back several times on the mass undergoing extraction, to increase the period of contact. When the extract appears sufficiently concentrated, it is

placed aside, and a fresh quantity of alcohol employed for the further extraction. The latter weak tincture is used instead of pure spirit for the extraction of a fresh portion of the material, so as to render the extract as strong as possible.

The further treatment of the alcoholic extract, whether prepared at ordinary temperatures or by heat, will be described in the next section.

VI.—*Treatment of the material to be examined with ether.*

The treatment of the material with ether is effected at ordinary temperatures in Robiquet's glass apparatus for extraction, or with large quantities in such an apparatus made of larger dimensions of tinned iron plate. In many cases it is necessary to treat the material to be extracted with ether previously to macerating it in alcohol. This is the case when free fatty acids are contained in the substance under examination. These acids are even dissolved out with other bodies by the exhaustion of the material with cold alcohol containing water. To surmount this disadvantage, these fatty acids must be removed by treatment with ether. In fresh materials, the presence of free fatty acids can seldom be detected. On the contrary, in substances which have been kept a long time, they can be frequently recognized. In these cases the fatty acids result from the decomposition of the fats contained in the fresh material.

VII.—*Treatment of the material to be examined with alcohol containing a small quantity of ammonia or potash.*

For this purpose a small quantity of the material is taken, and one portion is macerated with alcohol containing potash, and another with alcohol containing ammonia. The alcohol contains sufficient alkali when to an ounce of the spirit six or eight drops of a concentrated aqueous solution of potash or ammonia have been added. This operation must be performed in well stoppered bottles, which must be quite full of the material, but lightly packed. The alkaline spirit is poured in until the bottle is full up to the stopper, which is then closed. By the admission of the air an oxidation of the dissolved bodies would easily result. After standing several hours undisturbed, the contents of the bottle are placed on a linen filter and gently pressed. The fluid is mixed at once with as much hydrochloric acid as will render it slightly acid, and it should be observed whether a precipitate is produced in consequence or not. When no precipitate results, no further proceedings are taken; on the contrary, should there be a precipitate, a larger quantity of the material must be treated in the manner described. The method of further examining these solutions will be given in the next section.

To be continued

Editorial Department.

THE ACT OF PENNSYLVANIA REGULATING THE SALE OF POISONS.—The attention of our readers is directed to the communication at page 117 in relation to the law on the sale of Poisons. It will be there observed that according to the construction of the law by a member of the Bar, the liabilities of apothecaries and others who retail poisons, is much greater than at first was supposed, and that difficulties may occur in which the apothecary, with every intention of doing right, may get himself into trouble. We do not believe this mode of construing the law would be upheld by a jury, as against an apothecary, in a case that was reasonably within the usual action of physicians. We believe every apothecary who has a just regard to his reputation would hesitate to put up the prescription of a well-known physician, which, from its deleterious character, might do mischief, and therefore he would be much less likely to do it on a false one intended for illegitimate purposes. The law does not say that the dispenser shall know the writer of the prescription. For the same reason that we do not justify an apothecary in dispensing a genuine prescription, that evidently conveys the probability of error on its face, we do justify him in putting up a properly drawn prescription that conveys the probability of correctness, though it prove to be not written by a graduate. The law does not define who is a physician. The same power that made the law, grants the authority under which Eclectics, Homœopaths, Veterinary Surgeons and other irregular practitioners practice medicine, and it would hardly intend to confine the right of prescription-writing to the regular practitioners of medicine.

Further, we do not agree with Mr. Bonsall in believing that the law applies to the regular preparations of the Pharmacopœia in which any of the five prescribed poisons may be used, as Fowler's Solution, Laudanum, Syrup of Wild Cherry Bark, Tincture of Nux Vomica, etc., else it would be necessary to label those preparations "Poison" when prescribed by a physician, a course which would hardly be approved by the Faculty. In relation to the meaning of the expression, "personal application of some respectable inhabitant of full age," we feel more doubt—and would be glad to know whether the law really means, that the head of a family only is an eligible person for a purchaser of poison, who has no power to delegate his right to a servant, however well known the latter may be to the seller of the poison. If this be so, the apothecary should know it—because by

far the larger portion of corrosive sublimate that has been sold for legitimate purposes to housekeepers, has been obtained by servants with or without a written request for the same from employers, the servants being of full age and known to the apothecary. Should such quibbles and strainings of the letter of the law be, as has been suggested by Mr. Bonsall, capable of being sustained before a jury, it is high time that every apothecary was awake to the risk he runs in the conduct of his business.

We believe the only really valuable feature of the law, over and above the ordinary care of a respectable apothecary, is the requirement to keep a regular register, full and clear, of the several sales of poison. To us the law points in its spirit chiefly to criminal poisoning, and is intended to aid the cause of justice and to caution the dispenser.

THE DRUG EXAMINERS AND THE NEW ADMINISTRATION.—Our readers are generally aware that the Act passed by Congress, in 1848, usually called the Drug Law, requires for its execution special officers, denominated "Examiners of Drugs," at several of the principal ports of entry of the United States, viz: Boston, New York, Philadelphia, Baltimore, Charleston, and New Orleans. For a copy of this law see vol. 20th, page 292, of this Journal, and for subsequent action in relation to its working, the reader is referred to vol. xxv. page 297.

It cannot be doubted that the execution of this law in a proper manner will greatly tend to improve the condition of the drug market, more especially at the port of New York, where so large a proportion of imported drugs are entered; and it is equally clear to those who take the trouble to examine into the actual conduct of its officers, that its efficiency is becoming less and less evident, since the first appointments, which were made under the influence of a correct appreciation of its requirements. At the port of Philadelphia the examinership is now vacant, and the late "Examiner" has, for some time past, occupied the position of an "appraiser," with a much larger salary. Whatever inspection of drugs is effected, is carried out by this officer and the general Appraiser. The suspension of the Examiner's duties must either arise from motives of economy or because the office has become a sinecure. Be this as it may, within a month or two past several candidates for the vacancy have turned up, indicating that the office is not looked upon as undeserving of an incumbent.

Our attention has been called to this subject by the earnest movements which are taking place in New York among the Medical and Pharmaceutical bodies, in relation to the drug law and its practical exponents, as the following extract from a communication by Dr. E. R. Squibb, published at New York, in the American Medical Times of January 26th, 1861, will exhibit, viz:

To the Editor of the American Medical Times—

SIR:—As the time approaches for a change in the Federal Administration, and, consequently, in many of the offices held under that authority,

it becomes an important duty and interest of the medical profession to take some thought and action upon the execution of that special law, which in 1848 was interposed by Congress for the protection of the public and the profession against the "importation of adulterated and spurious drugs and medicines." During the month, commencing Nov. 20, and ending Dec. 20, foreign drugs and chemicals, to the amount of half a million of dollars, passed through the New York Custom-House, all of which are used in either food or medicine, and about \$200,000 of this is used in medicine alone, including some \$80,000 worth of opium and cinchona barks, the remaining value being made up in some two hundred different articles. All these are, or should be, in accordance with the law, subjected to a critical examination—not all by analysis or assay, because that would be impossible for any five persons to accomplish, whilst one man only is supplied by the law, and that with neither office nor apparatus—but by the judicious application of a thorough knowledge of drugs and chemicals, of their mode of preparation and adulteration, and of the application of the proper tests of quality in equivocal and suspected cases. These facts are all that will be necessary to show the primary and vital importance of this law to the medical profession and the public. Yet it is liable to become almost a dead letter when the offices of inspector are held by incompetent or careless persons; and still more as the commercial interests of importers generally are in direct opposition to a faithful execution of the law. A few words upon each of these conclusions may serve to place the matter in its true light. *First*, as to the importance of the law. If opium, cinchona barks, rhubarb, ipecacuanha, copaiba, colchicum, camphor, chamomile, aloes, nux vomica, cannabis, and scammony, not one of which is or can be produced in this country, are indiscriminately admitted from abroad, without regard to character or quality, the universal effect of competition and trade upon all open markets would supply these articles of all grades of value, and the lower grades in greatest abundance, because in trade, price and profit both take precedence over quality. Hence a large proportion of the profession and the public must, from this cause, be supplied with inefficient, impure, and often deleterious drugs. As the profession of medicine and the public will probably continue to use these articles, and have not in themselves the means or knowledge necessary to ascertain their true value, short of their application to human life and human suffering, it becomes evident that this law is of primary and vital importance in the true sense of those expressions.

Second. A good law is efficient, even when not fully carried into execution, because its existence, as such, makes it possible to carry it into effect at any time and in any case. Thus those who are timidly disposed to do wrong, are held partially in check. But even such persons have a gradual tendency, little by little, to try its force, until its provisions are insidiously disregarded and annulled. Hence, although the simple existence of a law of this kind upon the statute books does efficient service for a time, it soon becomes almost a dead letter; whilst through venality, incompetency, or carelessness, it is very liable to become far worse than useless, since it not only does not accomplish the object in either case, but must stand mischievously in the way of legitimate trade and commerce. That the natural effect of such a law is adverse to the exclusively pecuniary interests of importers, is evident from the facts, that, unlike most other classes of merchandise, the sensible properties of drugs and chemicals afford but little reliable information as to their intrinsic value; and that hence inferior articles may, with comparative ease, be either falsely

or ignorantly represented to be of superior quality, and be sold at better profit. The effect of the present law is well illustrated in the canvass now actively going on in the drug market here for the office of drug inspector at this port. Several candidates are in the field, they or their friends all actively engaged in getting the signatures of druggists and importers to their recommendations and claims for the office; and the canvass is carried on in the usual spirit whereby each strives to forestall the other in private and political influence, and to bring to bear the various interests and sympathies that can be made available, while the character of each is freely discussed. One name has been mentioned in the canvass which at once excited an expression of active opposition from a partner in one of the best drug houses in this or any other city, upon the ground that, if the person so named should occupy the office of inspector, the standard of quality would be raised so high, and would be likely to be so applied, as to materially injure the drug market of this city, and force the commerce in importation of drugs into other cities and channels wherein the law might not be carried out. In other words, that the policy of New York is to place such a person in the office as would not be likely to interfere with importations, by carrying the law into effect—that is, to find the man who in the necessary oath prescribed by the law, will “solemnly, sincerely, and truly swear. diligently and faithfully to perform the duties of the office as prescribed by the act, to prevent the importation of adulterated and spurious drugs and medicines,” and who will yet be sure not to do what he solemnly swears he will do. One such fact, well established as this is, goes far to show that, if the medical and pharmaceutical professions, through want of due thought or action upon this subject, leave it in the hands into which it naturally falls, namely, the political and importing interests, to fill these offices in the districts in which they are established by this law, these professions may be very sure that their interests, and those of the public, will be destroyed, or so perverted as to render this important and excellent law not only useless but absolutely mischievous. And this naturally introduces the special object of this article, namely, to urge upon the medical organizations in the immediate neighborhood of the six collectorial districts, where special examiners are authorized by this law, to take prompt and determined action in the matter. At this port it is especially incumbent upon the medical and pharmaceutical bodies to make an early and energetic movement, because probably two-thirds of all the imported drugs and medicines used in the United States are entered at this port. The new administration should be early and earnestly apprised, not only of the vital importance of this law, but also of the difficulties and responsibilities of its proper execution, and of the danger which attends the appointment of its officers through political or pecuniary interests and considerations. The law requires the Secretary of the Treasury to appoint “suitably qualified persons” to carry into effect its provisions, and, as in cases of appeal from the decision of the Examiner, it provides that the Collector shall procure the services of some “competent analytical chemist, possessing the confidence of the medical profession, as well as of the colleges of medicine and pharmacy, if any such institutions exist in the State in which the collective district is situated,” to decide such questions of appeal, it is plain that the law does in itself recognise in the medical and pharmaceutical organization, a proper, legitimate, and necessary influence in its execution and application. And it is not probable that any administration would fail to be convinced of this importance, and, when so convinced by proper representations, would fail to exercise due care in the appointments, or give due and respectful weight and attention to

the combined action of the medical and pharmaceutical institutions which are invoked by the law itself, whenever such institutions might offer their services and advice in filling the offices in their respective districts. This is precisely the course which will probably be adopted by all the medical and pharmaceutical organizations of this district with unanimity and decision. The Academy of Medicine and Kings County Medical Society have already discussed the subject, and fully recognising its importance, have appointed committees to confer with each other, and with the College of Pharmacy, with the State Medical Society, and all other societies that may be accessible. These committees have power, after due conference, to lay before the new administration the full appreciation by the bodies they represent, of the importance of the law, and the very great importance of having it faithfully executed at this port by a competent officer; and to offer to the appointing power, if such service be desired or permitted at their hands, the nomination of a proper person to fill the office. By this joint committee the whole medical and pharmaceutical, and, as far as these can represent it, the whole public interest of this district will be concentrated and represented, and will thus be rendered easily available to the appointing power, if that power should decide to accept their proffered suggestions and advice in the important local duty of selecting a proper person to fill the local office. By reserving their nomination until it is either asked for or admitted, the committee places itself and the bodies it represents, upon the high ground which is inaccessible to the indignity of a refusal to recognise its true spirit and intention in the matter; whilst in making the Government fully aware of the importance of the law, and the difficulties of getting it properly executed, it fulfils the whole duty of the medical and pharmaceutical professions, and imposes the whole moral responsibility upon the appointing power. At the same time, if it should be permitted to make a nomination, and if that nomination should be confirmed, the medical profession through it assumes a most important responsibility to the public at large. Such responsibility, however, legitimately belongs to the medical and pharmaceutical professions, because their true interests unite them with the public interests at large, and because from education, and from daily familiarity with the subject in all its various bearings, they are the most competent to form a correct judgment. Besides this, their local position gives them additional knowledge of the requirements of a local office in their midst, and of the character of any person whom they would be willing to nominate and endorse for such an office.

In a close scrutiny of this law "to prevent the importation of adulterated and spurious drugs and medicines," its excellent objects and intentions are prominently apparent, and the general means by which it provides for the accomplishment of its objects are wise and good, and are as practical and sufficient as any ordinary foresight could make them, independent of experience in actual application. But in the course of some ten years' experience in application, certain points and portions of the law appear to need amendment and amplification to meet the necessities of a more faithful and thorough application; and such amendments and alterations have been proposed, and are still strongly advocated by the New York College of Pharmacy, and by persons most familiar with its operations, including Dr. Bailey, who for many years held the office of examiner at this port. Some of these amendments and amplifications, in the order of the writer's estimate of their importance, are as follows:—

First. The appointing power should be in the President, with a confirmation by the Senate; and the President should be legally authorized to seek for, or admit of, the advisory nomination of candidates for the office,

by the medical and pharmaceutical organizations of the districts in which they are to officiate ; or, what would be still better, the appointments should be made only after a thorough examination before the medical boards of examination of the army or navy. By such an examination the competency of candidates might be most thoroughly and effectually determined, and the true intentions of the law be best secured. These Boards meet annually, under the orders of their respective departments.

Second. The salaries offered by the law are not at all in proportion to the required integrity, knowledge, and skill. The highest salary, namely, that of sixteen hundred dollars per annum for the port of New York, is no adequate compensation for the faithful and capable examination of some six millions of dollars' worth of drugs and medicines, with the necessary records, reports, statistics, etc., which should belong to the office. Again : the thorough and faithful execution of the office where such vast quantities are presented, and so much at stake, is entirely beyond the possible capacity of any one person, no matter what his skill or knowledge may be. Therefore, the officer should be an inspector, rather than an "examiner," and should be allowed an assistant, to be appointed by his own selection and nomination, at a salary of one thousand dollars per annum. The inspector should receive at least three thousand dollars per annum at this port, and fifteen hundred dollars at the other ports, and should be provided with the proper office accommodations, and the necessary apparatus and reagents. The present law appears deficient upon all these points, since it supplies only a single man, and at a salary below that of a fair merchant's clerk, and fails to provide him with the means necessary to the performance of his duty, whilst he thus, unaided, is made responsible for the quality of some six millions of dollars per annum worth of articles of primary importance as food and medicine, and also of revenue.

At the suggestion of the President of the College, the subject was brought before the last meeting of the Board of Trustees of the Philadelphia College of Pharmacy, and a committee appointed to examine whether the College should recommend any course of action to the appointing power, or take any other steps in the matter. That Committee have since reported a memorial to be submitted to a special meeting of the College on the 4th of March. In the discussion which occurred anterior to the appointment of the Committee, the views of the joint medical and pharmaceutical bodies of New York, as set forth in a communication from one of their representatives, were considered, especially the propriety of recommending the Government to avail themselves of the Naval and Army Board of Medical Examiners, but the sense of the meeting seemed against that suggestion, as not being so well calculated to produce practically efficient officers as an examination in which the Colleges of Pharmacy took part. To us the merit of the New York suggestion rests mainly in the fact that the Government would have confidence in the impartiality of the Navy or Army Medical Examiners in their decision of the scientific merits of the candidates ; in regard to the practical business fitness of the candidate who might be theoretically qualified, they would have to call to their aid the testimony of other parties. We confess, however, to have but little confidence in the probability of much improvement in the working of the law whilst it has to contend with the side issues of political aspirants.

PROCEEDINGS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.—The Executive Committee of this Association have sent the Proceedings of the meeting of 1860 to all the members by post or otherwise, except to those in California, and they hope soon to obtain a medium of forwarding the package destined for that State. If persons who are entitled to them have not received their copies, they should notify the Chairman of that Committee (W. Procter, Jr., Philad.) and suggest a safe medium of sending the book. It is much to be desired that those members of the Association who feel a lively interest in its success and advancement, should not at this juncture, when the condition of public affairs absorbs so large a share of the attention of every citizen, lose sight of the importance of this benevolent and disinterested scientific movement in favor of the improvement of pharmacy and pharmacutists—a movement so catholic in its character that it should proceed uninfluenced by the political aspects of the country. Let such members take the initiative, by encouraging those gentlemen who agreed to contribute special reports to the St. Louis meeting, to accomplish their work, so that those who may go to that distant city may not be disappointed in receiving a return of valuable scientific information. We have some valued members in the south and south-west, and as the meeting at St. Louis is at the most southern point at which a meeting has yet been held, it is to be hoped that the attendance of southern members will be larger than heretofore, especially as the means of travel by the great water routes of that region are ample.

INFAMOUS QUACKERY.—It is said of some poisons, that when taken in an overdose, the emesis they excite proves the safety of the subject. So of quackery. In some of its forms it is so self-evidently false and disgusting that all reasonable persons will at once reject its assaults. Our attention was recently called by a friend to a handbill from a quack of this genus purporting to be a “veil Doctor” with astonishing natural powers. After various statements of his ability, he has the assurance to declare that he appeared before the National Medical Convention of 1850 at Washington, for the revision of the Pharmacopœia, and demonstrated his remarkable powers. He then refers for information to a list of names of Physicians and Pharmacutists of New York and Philadelphia, among the rest our own, who were there in attendance, and which he probably extracted from the preface of the U. S. Pharmacopœia. It need hardly be said that the whole affair is false, and that the use of names in this manner, for a false pretence, would subject the rascal to legal action under the proposed new law of Pennsylvania.

THE CAVENDISH SOCIETY.—Information is hereby given that the 13th volume of Gmelin's Chemistry can now be had of us, as the Society's agent at Philadelphia, as the only volume for 1859—price \$5.40—and also it may be well to state that Dr. Redwood, General Secretary of the Society, in a letter dated London, Jan. 11, 1861, states that the 14th volume of Gmelin's

Handbook is now in press, and that it may be expected by the last of April. We also take this opportunity to say that the last invoice of books from London embraced several copies of Gmelin, from the 2d to the 13th volumes, inclusive, which are held for sale—the first volume being out of print.

CALIFORNIA YEAST.—Since our issue of September last, several communications have been received relative to the so-called “California Beer Plant.” Mr. Perrot, of Philadelphia, was informed that—

“A party of California gold diggers left a pan containing some molasses under a tree, and on returning to the same spot after a few days, during which period it had rained, they found it to contain a liquid resembling *beer*; hence its name.

Probably some nitrogenous matter from the tree fell into the pan during the rain, which subsequently originated the fermentation of the sugar.”

Mr. G. W. McFee, of Monroe, La., after examining the “California Beer Seed,” is “disposed to think it is nothing but the result of fermentation,” and finds that, “if you mix half a pint of molasses with a quart of water, and set it in the sun, this ferment will form in the bottom of the jar, and will continue to form on the addition of fresh portions of syrup or molasses and water, resembling the ‘*seed*’ in every particular.”

We doubt not these inferences are correct, and that all those who imagined unpleasant results to arise from the use of bread made with the “California Yeast,” will have to attribute such effects to other and graver causes than the ferment in question.

OBITUARY.—THOMAS SOUTHALL, of Birmingham, England, a valued member of the Pharmaceutical Society of Great Britain, died at Edgbastin, Birmingham, January 12th, 1861, after a few days’ illness, from inflammation of the lungs. Mr. Southall was born in Leominster in 1795, and was apprenticed to the late John Bell, of Oxford street, London, father of the late Jacob Bell. Mr. Southall was a prominent member of the Society of Friends, and one of the founders and supporters of the Pharmaceutical Society, and a contributor to the pages of its Journal. His retiring, modest character always prevented Mr. Southall from accepting public honors or employment. As a pharmacist, he stood deservedly high. The Birmingham Gazette, from which we extract most of the above, attributes to this gentleman a most unselfish and liberal character, united to a modesty that was invincible to all the temptations of honor and position.

DR. KLOTZSCH.—Died at Berlin on the 5th of November, 1860, Professor Johann Frederick Klotzsch, M. D., Ph. D., aged 55 years. Dr. Klotzsch was originally an assistant apothecary, and diligently pursued the study of natural history, and especially of botany. He was at one time curator of the herbarium of Sir William J. Hooker, and subsequently of the Royal Herbarium of Berlin. Dr. K. was a careful and laborious observer, and wrote much on botanical and pharmacological subjects.

THE
AMERICAN JOURNAL OF PHARMACY.

MAY, 1861.

ON TINCTURE AND FERRATED TINCTURE OF BARK.

BY JNO. M. MAISCH.

Among the innumerable preparations of Peruvian Bark, one called "Ferrated Tincture of Bark," has attracted a good deal of attention. As originally suggested by Mr. S. Simes, of this city, Huxham's tincture of bark prepared with Calisaya bark, is deprived of cinchotannic acid by means of freshly precipitated sesquioxide of iron, and the filtered tincture, thus altered, is afterwards finished by dissolving in it ammonio-citrate of iron. Mr. A. B. Taylor, who experimented with it at that time, came to the conclusion that but a small quantity of iron was held in solution; but after the publishing of an analysis made by Booth, (*Amer. Journ. Ph.* 1853, 295—402,) the whole subject has apparently been left to rest. Parrish's *Practical Pharmacy*, page 133, however, states, that citric acid and the citrate dissolved in the tincture produce a bulky precipitate, which from ten fluid ounces contains but 3 grains of iron.

In taking up this subject, I have sought to settle the matter in a different way. My investigations were in the first place directed to the tincture of bark.

It is well known that the various tinctures of cinchona as directed by our *Pharmacopœia*, produce in a short time a brownish red precipitate, which increases gradually. I believe that this precipitate has generally been taken to be cinchona red, or some similar product of oxidation, which, being of little value, might be rejected. As the tinctures are always demanded in a clear and transparent condition, this precipitate is, of course, thrown aside. If it is separated from the clear liquid by filtration, and washed

with diluted alcohol, until this ceases to take up anything, the residue upon the filter is insoluble in water and possesses scarcely any taste; but when it is now treated with acidulated water, a slightly colored solution is obtained, which, besides some cinchonic red, contains quinia and quinidia. For if this solution is supersaturated with ammonia, and then agitated with ether, the ether on evaporation leaves a residue which is partly gumlike, partly of a crystalline structure, and gives with chlorine water and ammonia the characteristic green color of those two alkaloids.

The result is the same, whether tincture of red or yellow bark, or any compound tincture of either kind, is employed. I have also examined several precipitates from ferrated tincture of bark, and have discovered the alkaloids in every instance. Of some of these last named tinctures I did not learn the process, but among my notes I find that the precipitate which, on standing, had been separated from the ferrated tincture prepared by its originator, Mr. Simes, contained the alkaloids. I have likewise obtained them from the tincture prepared by myself, by sesquioxide of iron and ammonio-tartrate, or citrate of iron, instead of the ammonio-citrate, and from the precipitate occasioned in tincture of bark by an acid solution of citrate of iron. In view of the uniformity of the results obtained by many experiments, I can therefore assert, that *the precipitates separating from the various simple, compound and ferrated tinctures of bark contain a portion of the alkaloids in a state insoluble in water and diluted alcohol.*

The precipitate obtained from a simple tincture of bark, after it has been washed with diluted alcohol, and treated with acidulated water, consists chiefly of cinchonic red; it is insoluble in water, scarcely soluble in ether, freely soluble in strong alcohol and reprecipitated by water; it is dissolved by caustic alkalies with a deep blood-red color, and precipitated by acids, in the form of brownish red floccules; the alkaline solution neutralized as nearly as possible, produces a purplish brown precipitate with acetate of lead and a yellowish brown with sesquichloride of iron. The cinchonic red has the behaviour of a weak acid; and inasmuch as it is formed according to Schwartz, by the oxidation of cinchotannic acid, I propose for it the name of

rufo-cinchotannic acid, which is in accordance with the nomenclature adopted for the red bodies obtained by oxidation from the various tannic acids.

Whether the precipitate appearing in simple tincture of bark consists only of this rufo-cinchotannic acid and the alkaloids, I have neglected to ascertain, possibly kinic acid may be likewise found in it. To this my attention was not drawn, until I operated with the precipitates from ferrated tincture of bark; when they were treated with diluted sulphuric or muriatic acid, and the filtrate subsequently over-saturated with ammonia, no precipitate of oxide of iron took place, but sulphocyanide of potassium indicated the presence of a considerable quantity of the sesquioxide; citric and tartaric acids were not present, but as kinic acid likewise prevents the precipitation of iron salts by alkalies, I tested for it, and have obtained satisfactory evidence of its presence, though the quantity I had to operate on was too small to obtain kinone in an isolated state. When the precipitate was heated with diluted sulphuric acid and binocide of manganium, the peculiar pungent odor of kinone was given off, and I obtained a slight yellow sublimate for a time; boiled with strong sulphuric acid a grass green color was produced.

If these reactions may be regarded as a sufficient proof of kinic acid in the precipitate from ferrated tincture of bark, the probability is, that the precipitate from the simple tinctures also contains it. But if we look to the importance in a medicinal point of view of the constituents of the precipitate, the alkaloids take the first place; next in order the rufo cinchotannic and kinic acids. Whether kinic acid possesses any medicinal virtues at all, I believe has not been ascertained yet, but the advantage of retaining it in solution would be to represent thus the constituents of the barks in their natural combination. While the tinctures of our Pharmacopœia aim at this end, *the process is entirely unsatisfactory*. If we exhaust powdered Peruvian bark by diluted alcohol in a displacement apparatus until the resulting tincture is free from alkaloids, alcohol, subsequently employed, will take up another portion of alkaloids.

It is asserted, and I believe, correctly, that vegetable material treated by percolation, cannot be absolutely exhausted by any

given menstruum, because of our inability to break up each individual cell. While I recognize this, I believe the cause of the incomplete exhaustion, in the above instance, to lie in a different direction, namely in the natural condition of the alkaloids in the bark, which are there partly combined with kinic, cinchotannic and probably also, at least in some species, with rufo-cinchotannic acid. This fact will point out directly the necessity of employing for our tinctures a stronger alcohol.

Simple tinctures made from red or Calisaya bark with diluted alcohol, often commence to precipitate before the percolation is finished, or at least in the course of a few days. A tincture, however, prepared by percolation with alcohol, of .877 spec. grav. (3 fluid parts alcohol of .835 and 1 p. water,) retains every constituent in solution, though it *may*, perhaps, ultimately produce some precipitate, and the bark, after exhaustion, does not yield any alkaloids to a stronger alcohol. The rational solvent, therefore, for our official tinctures is, not diluted alcohol, but a mixture of 1 part of water with 3 parts of alcohol, or perhaps still better, official alcohol.

We must keep in mind that by employing a stronger alcoholic menstruum, changes by oxidation are by no means prevented, but on the contrary rather facilitated, as I attempted to prove two years ago, in a paper on the preservation of fluid extracts. To the doctrines laid down in that paper, I still adhere; notwithstanding this, I now recommend a menstruum for the tinctures of bark, stronger in alcohol, for the following reasons:

The principal constituents of bark, the alkaloids, are not likely to be easily affected by the exposure to the air in the presence of alcohol; at least not if heat is avoided as much as possible. I have isolated quinia from tinctures and their precipitates several years old. I have also observed kinic acid in the tincture, and as I have shown above, in old precipitates from ferrated tincture of bark; kinic acid, for this reason does not appear to be prone to change by exposures. Rufo-cinchotannic acid, however, as has been shown by many chemists, increases in quantity with the age of the solution, while the cinchotannic acid gradually disappears; the medicinal effects of this product of decomposition, if we may judge from analogy

with gallotannic acid, are similar to its tannin. Now, if it is correct to choose of too evils the least, we have to select a menstruum which secures to us the whole virtues of the bark, though they may partly be affected by oxidation, in preference to the one which does not exhaust the bark entirely, is no safeguard against oxidation, and necessitates a considerable loss by its inability to preserve a complete solution.

Whether the increase of the strength of alcohol is objectionable from a medicinal point of view, is not for me to determine, but if we must have tinctures of bark, let us at least have such—this I conceive to be the pharmaceutical view of the subject—which preserve, better than others, their properties.

Philadelphia, April, 1861.

ON CANE SUGAR IN ITS RELATIONS TO SIMPLE AND OTHER SYRUPS.

BY WILSON H. PILE, JR.

(An Inaugural Essay presented to the Philadelphia College of Pharmacy, 1861.)

Every one who has been accustomed to prepare the various syrups and saccharine fluid extracts demanded in pharmacy, must be aware of the uncertainty, and often perplexity, which attends their manufacture. The difficulty arises in part from a faulty manipulation, in the boiling being too long continued, or from a badly shaped vessel, occasioning too great a loss by evaporation, before even the boiling point be reached. In other cases a want of proper adjustment of the liquid menstrua to the amount of sugar employed, giving a preparation either too thin or dense, or rendering it difficult or impossible to make the exact quantity required by the formula. In the non-medicinal syrups a skilful operator can judge with sufficient accuracy by various familiar signs, when the proper degree of consistency is arrived at; but this could not be done by an inexperienced hand, and with the more important fluid preparations, where sugar is employed a more exact and certain method must be used.

In our national Pharmacopœia, it has unfortunately happened

that in many of the formulæ the difficulties above alluded to are encountered, and the resulting syrup is either disposed to fermentation or to deposit sugar by crystallization. While in other formulæ the quantity of the preparations, when finished, are greater than that intended, and in consequence its medicinal activity proportionally diminished.

The design of the writer of this paper is not to go into any consideration of the changes which sugar may undergo, in the various syrups, by long boiling, or from chemical changes occasioned by contact with substances with which it may be combined; but to offer some remarks of a more practical character.

In pursuit of the following investigations, Lovering's pulverized sugar was employed. In making syrups, however, it is very apt to form a mass at the bottom of the vessel, thereby being liable to be burned, where heat is taken to effect the solution; crushed sugar has not this tendency, and is therefore preferable in most cases. This sugar, as generally met with, is nearly dry, 20 grs. being exposed to a heat of 180° Fah. for two hours, lost .19 grs. or .95 per cent. The specific gravity of it was found, by several trials, to be 1.589. This result was ascertained by finding the weight of the bulk of a quantity of sugar, compared with the weight of an equal bulk of nearly absolute alcohol. This liquid was taken on account of the almost insolubility of sugar in it, and in order to guard against error which the small amount taken up might cause, the alcohol used was allowed to stand with dry sugar before being used.

A sample of the sugar without previous drying was found to have a specific gravity of 1.58 and as this represents the official sugar, I have therefore used it in the succeeding investigations.

By calculation, 1 lb. of sugar will be found to equal 8 fluid oz. Thus, 1 lb. = 5760 grs., dividing this by its specific gravity ($5760 \div 1.58$) its bulk in grains will be 3645.569, which divided by 455.69 grs., the number of grains in a fluid ounce gives 8 fluid oz. I have, however, found that when sugar is dissolved in water it occupies a less space than above stated, showing a slight condensation. This was ascertained by direct experi-

ment and verified by calculation, as follows: By trial, 5760 grs. of sugar, and 3094 grs. of water, gave a syrup having a specific gravity of 1.319; made from these quantities the syrup weighs 8854 grs., and as its specific gravity is 1.319 its bulk is $\left(\frac{8854}{1.319}\right)$ 6712.6 grs., subtracting from this the bulk of the water, we have 3618.6 grs., for the bulk of the sugar, or $\left(\frac{3618.6}{455.69}\right)$ 7.941 fluid oz.* This divided into its weight $\left(\frac{5760}{3618.6}\right)$ gives 1.591, which represents the apparent specific gravity of sugar in this solution occasioned by condensation. In solutions, however, of different densities, the condensation varies, being greater in proportion as the quantity of sugar diminishes. A few results are given below, taken from several experiments.

In a solution of 10 per cent. of sugar, the apparent specific gravity, arising from a greater degree of condensation, equals 1.613.

In one of 25 per cent.	1.608 sp. gr.
“ 50 “	1.602 “ “
“ 65 “	1.593 “ “

The bulk of 12 ounces of sugar in solution has been shown to equal 7.941 fluid ounces, it may therefore for all practical purposes be considered that $\frac{2}{3}$ of its weight will equal its bulk in fluid ounces. As the idea generally prevails, that half of its weight equals its bulk, this fact may be of some importance.

As the above mentioned differences in the condensation of sugar were ascertained by experimenting with various percentages, I have collected these together and formed the following table:

Table of the specific gravity of Sugar in solution, 60° Fah.

PERCENTAGE OF SUGAR.	SPECIFIC GRAVITY.	PERCENTAGE OF SUGAR.	SPECIFIC GRAVITY.
0	1.000	40	1.1778
5	1.0191	45	1.2043
10	1.0391	50	1.2310
15	1.0600	55	1.2597
20	1.0812	60	1.2889
25	1.1045	65	1.3191
30	1.1281	70	1.3503
35	1.1526		

*On the preceding page, 1 lb. of sugar is shown to have a bulk of 8 fluid ounces, while here in solution it has only 7.961 fluid ounces.

As the experiments in this essay were chiefly made in reference to pharmacy, the conclusions arrived at are as follows: That in many of the U. S. P. formulæ, the proportion of sugar employed is either too great or insufficient; while in others, the quantity of fluid preparation, when made, does not bear that proportion to the drug or active principle which was evidently intended.

Among the first may be noticed simple syrup, syrup wild cherry bark and syrup ipecac; among the latter, fluid extract senna and fluid extract rhubarb and comp. syrup squills.

Syrup made according to the official directions, will crystallize, unless in very warm weather, and will have a specific gravity of 1.327, instead of 1.319. If a syrup that will not deposit crystals, and having a density of about 1.320, should be chosen by the framers of the forthcoming Pharmacopœia, the following formula will meet these requirements:

Dissolve with heat, sugar 36 oz., water 20 fluid ounces; when finished, this should be made to measure 44 fluid ounces, or weigh 55 oz. by the addition of water if necessary.

The following formulæ may prove useful to the apothecary: To make a pint of syrup of 1.320 specific gravity, take $13\frac{1}{4}$ oz. sugar and $7\frac{3}{8}$ fluid ounces of water. 1 lb. avoirdupois requires $8\frac{1}{8}$ fluid ounces water, and should measure $17\frac{3}{4}$ fluid ounces. In all these cases the amount lost by evaporation, is to be made up by the addition of water.

In making syrup of wild cherry bark, we find that the quantity of sugar is too small to insure stability to the preparation, it being only 24 oz. to the pint of solvent. By taking 28 oz. a better syrup is obtained.

In following the official directions for making fluid extract of senna, we have a preparation which measures 33 ounces and $5\frac{1}{2}$ drachms. If the fluid extract was intended to represent one ounce of the drug to each fluid ounce, it follows that there is either too much sugar employed, or that the alcoholic tincture is not evaporated sufficiently. To obtain 30 fluid ounces of the extract, retaining the same relative proportion of sugar, evaporate the tincture to 18 fluid ounces and add 18 oz. of sugar.

In fluid extract of rhubarb, the same remarks are applicable; in carrying out this formula, we obtain a product measuring 8

fluid ounces and $6\frac{3}{4}$ fluid drachms. As this fluid extract is too thick, the sugar might be reduced to $3\frac{3}{4}$ oz. with advantage, and the preparation would then measure 8 fluid ounces.

Philadelphia, Feb. 1861.

ON CHLOROFORMIC SOLUTION OF GUTTA PERCHA.

By WILLIAM HODGSON, JR.

[NOTE.—Soon after it was known that gutta percha would dissolve readily in chloroform, Mr. Hodgson introduced the dark colored impure solution as an application for abraided surfaces, in lieu of court plaster. Subsequently, about eight years ago, he ascertained a method of depriving the solution of color, so as to yield, by evaporation, a colorless layer when applied to the skin. At the request of Dr. George B. Wood, Mr. Hodgson cheerfully communicated his formula for the use of the Pharmacopœia Committee, and with the sanction of those gentlemen we publish the recipe in advance of the Pharmacopœia. The following is a transcript from the report of the College of Physicians of Philadelphia on the U. S. Pharmacopœia.—ED. AMER. JOURN. PHARM.]

LIQUOR GUTTÆ PERCHÆ CHLOROFORMICUS.

Chloroformic Solution of Gutta Percha.

Take of Gutta Percha, in small slices, an ounce and a half.

Chloroform, twelve fluid-ounces.

Carbonate of Lead, in fine powder, two ounces.

To eight fluid-ounces of the chloroform contained in a bottle, add the gutta percha, and shake occasionally till it is dissolved; then add the carbonate of lead, previously mixed smoothly with the remainder of the chloroform, and having shaken the whole thoroughly together, several times, at intervals of half an hour, set the mixture aside and let it stand for ten days, or until the insoluble matter has subsided, and the solution has become limpid, and either colorless or of a slight straw color. Lastly, decant, and keep the solution in a glass stopped bottle.

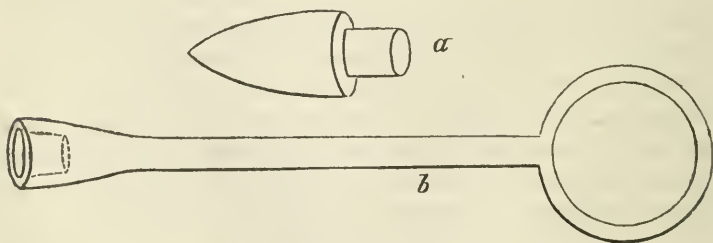
REPORT ON SUPPOSITORIES.

By ALFRED B. TAYLOR.

(Read at the Pharmaceutical Meeting of the Philada. College of Pharmacy, April 2d, 1861.)

The demand for suppositories has, within the last year, largely increased, and much attention has been given to the preparation of these appliances. The method of preparing them in paper moulds has been, in a measure, superseded by the more elegant and convenient one of casting them in metallic moulds. They are thereby not only made more regular and handsome in appearance, but at the same time a greater facility is given for thoroughly incorporating the medicinal substances prescribed. I have found that the best mode of making suppositories, is to have the moulds very cold, so that on pouring the melted mixture into them, it becomes immediately solidified, and the suspended powder is thereby prevented from settling, which it is almost certain to do, if paper moulds are used. The moulds may be made cold by placing them on the ice for two or three minutes, previous to using them.

The subject of the best form for suppositories having been referred to me, I have made some experiments in relation thereto. It occurred to me that an improvement might be made on the ordinary form of suppositories, (a simple cone,) by having them so shaped as to fit an instrument for inserting them. Acting upon this idea, I have procured metallic moulds, which are herewith shown, for making them of the shape of the annexed figure, *a*, as also an instrument for inserting them, which I have called a *suppositer*, *b*.



It will be seen that they can be used either with or without this instrument.

Suppositories made in these moulds, of butter of cocoa, weigh twenty-five grains each, and can be medicated in any manner the physician may direct.

I will only add that they have been used by several physicians, who express themselves much pleased with them.

ON SEVERAL EXTEMPORANEOUS PHARMACEUTICAL PREPARATIONS.

By WILLIAM H. H. GITHENS.

(An Inaugural Essay presented to the Philadelphia College of Pharmacy.)

INTRODUCTION.

Having observed a great want of stability in the mixtures of extract of cannabis indica, resin of guaiacum and balsam of tolu, as called for by the usual extemporaneous prescriptions of physicians, it occurred to me that much more elegant preparations might be introduced to take the place of some of those now in use. And also, having experienced difficulty in compounding certain substances, so as to produce a mass with satisfactory pilular consistence, I instituted a series of experiments upon these subjects, some of which were quite successful.

ON THE BEST METHOD OF SUSPENDING EXTRACT OF CANNABIS INDICA IN AQUEOUS MIXTURES.

Experiment 1st.—One grain of extract of Indian hemp was softened by trituration with a few drops of ether, and then mixed with two fluid drachms of glycerine. This mixture was agitated until entirely deprived of ethereal odor. It formed a transparent solution of the extract; but upon the addition of an equal bulk of water, the extract was entirely precipitated.

Exp. 2d.—Two grains of extract of cannabis were triturated with one fluid-drachm of olive oil, forming, without difficulty, a transparent solution. This was mixed with two and a half fluid-drachms of mucilage of gum arabic, and then with sufficient water to make the mixture measure one fluid-ounce. This preparation is entirely permanent.

Exp. 3d.—Thirty grains of Indian hemp were dissolved, a before, in one fluid-drachm of olive oil, also forming a transparent solution. With two drachms of gum arabic and a sufficien-

quantity of water to make the mixture measure one fluid-ounce, a perfect emulsion was obtained without difficulty.

Remarks.—The extract, if of a good quality, is perfectly soluble in all proportions in olive oil. The second and third experiments are both introduced, to show that the formula will answer for both dilute and concentrated mixtures. These emulsions, after standing undisturbed for six months, had separated into two layers; the upper one being apparently composed of the extract, oil and gum in combination. The lower one was almost perfectly colorless. A slight agitation, however, sufficed to mix them perfectly, as when first combined. No perceptible alteration had taken place, either in taste or odor, during the lapse of time above mentioned.

In view of the increased use of *cannabis indica*, would it not be well to introduce to the notice of physicians a syrup of that article, containing from one to four grains to the fluid-ounce? It could be very easily prepared by forming an emulsion, as before directed, and adding a sufficient quantity of simple syrup to make up the required measure; flavoring to suit the taste.

While experimenting with the extract of *cannabis indica*, I discovered that one of the specimens which came under my observation, although a well authenticated article of Squire's manufacture, was not entirely soluble in strong alcohol; twenty per cent. of it consisting of a reddish-brown substance, soluble in water. This was not found in any other specimen.

ON THE BEST METHOD OF SUSPENDING RESIN OF GUAIAECUM IN AQUEOUS MIXTURES.

Exp. 1st.—Thirty grains of gum guaiacum were softened in one fluid-drachm of olive oil, by means of trituration, in a slightly heated mortar; by continuing the trituration for some time, a pasty solution was obtained. This was made into an emulsion without any difficulty, with two drachms of gum arabic and a sufficient quantity of water to increase the measure to one fluid-ounce.

This recipe did not perfectly stand the test of time; at the end of six months the emulsion had separated, one portion having risen to the top; this was readily mixed with the liquid portion by agitation, and formed a very dense emulsion: another portion, of a brown color, had settled to the bottom; it seemed

to consist of impurities and particles of the resin which had escaped solution in the oil.

Exp. 2d.—One drachm of resin of guaiac was triturated with half a drachm of carbonate of soda and a few drops of water, until of a uniform pasty consistence; it was then made into an emulsion, with one drachm each of sugar and gum arabic and a sufficient quantity of water to measure one fluid-ounce. A slight deposit only occurred with this mixture. The effect of the soda on the taste was to give a flavor strongly resembling that of cloves.

ON THE BEST METHOD OF SUSPENDING BALSAM OF TOLU IN
AQUEOUS MIXTURES.

Exp. 1st.—One scruple of tolu was dissolved in ether, and triturated with one scruple of sugar and two of gum arabic, until all the ether was dissipated, and a dry powder remained; this was mixed with half a fluid-ounce of water gradually added, and formed at the time a very handsome emulsion; but the particles of the balsam slowly agglutinated, and finally formed a mass at the bottom of the vessel.

Exp. 2d.—One scruple of balsam of tolu was dissolved in ether, and mixed with the white of an egg, triturated until all the ether was dissipated, and then mixed with a small quantity of water. The tolu subsequently precipitated.

Exp. 3d.—One drachm of very hard, pulverizable tolu was partially dissolved in olive oil, in a heated mortar; this was readily made into an emulsion with two drachms of gum arabic and a sufficient quantity of water to make the whole measure one fluid ounce.

A deposit which fell seemed to consist almost entirely of impurities, the emulsion continuing very dense and possessing the taste of the balsam in a very marked degree.

Exp. 4th.—An attempt to form a more perfect solution of the tolu in olive oil, by dissolving the balsam in ether, mixing with the oil, and then triturating until all the ether was dissipated, was not successful, the tolu concreting into a mass when deprived of ether.

Exp. 5th.—One drachm of balsam of tolu was triturated with half a drachm of carbonate of soda and a few drops of water, until of a smooth consistence; it was then made into an emul-

sion with one drachm each of sugar and gum arabic, and a sufficient quantity of water to measure one fluid-ounce. A slight deposit occurred.

Pills of Iron by Hydrogen, &c.—Pills of perfectly insoluble substances, such as iron by hydrogen, can be very readily made into a tough mass, of a perfectly satisfactory consistence, by the use of a small portion, five grains to the drachm, of powdered tragacanth, with honey. No water must be used, or the mass will become brittle. The only objection offered to this plan, is, that the pills become very hard; but I have found that, even after having been made several months, they are perfectly softened by maceration in water for half an hour. This process will answer very well for pills of sulphate of quinine, as it makes them small and compact, and not liable to flatten.

Pills of Camphor.—There is frequently great difficulty experienced in compounding recipes containing camphor, to produce a mass of good pilular consistence; this difficulty may be obviated by the use of soap and honey as excipients, unless they are contraindicated by the accompanying constituents of the prescription.

Sugar coating pills for prescriptions.—Pills may be very conveniently coated with sugar for extemporaneous prescriptions, by first moistening the pills with a strong solution of balsam of tolu in ether or chloroform, throwing them immediately into a box containing sugar in a very fine powder, and shaking the box for a few minutes. The application may be repeated if the first coating is not as thick as would be desirable. This process is expeditious and satisfactory, after a few attempts, and offers no resistance to the solution of the pill in the juices of the stomach. If the pills are soluble in the ether, a thick mucilage of tragacanth or gum arabic may be substituted.

Results of an examination of a deposit found in Anise water.—A precipitate observed in anise water consisted of a crystalline scaly substance, with an insoluble flocculent matter.

I first treated this precipitate with very dilute nitric acid, which dissolved out the crystalline substance; bicarbonate of potassa added to this solution caused a precipitation. Chlorohydric acid had the same effect as nitric. The flocculent matter was insoluble in all the solvents tried.

Under the microscope the crystals appear to be of different forms, some being prisms, others pyramids, and some in the shape of a cross. They all reflect the light very brightly, appearing like stars, although viewed by diffused light.

I have also observed a precipitate, having the same characters, in fennel water, and as the solid constituents, or steareoptenes, of these oils are identical in composition, I have arrived at the conclusion that the crystalline substance consists of an acid in combination with magnesia, which acid is probably formed by the oxidation of the steareoptene, in consequence of its minute division in contact with the water and magnesia.

NOTE ON THE SUPPOSED CHEMICAL COMPOUND OF TANNIC ACID, ETHER AND WATER.

By EDWARD PARRISH.

In justice to my colleague, J. M. Maisch, I desire to call attention to an observation of his, made previously to the recent paper of Professor Bolley, noticed in the current number of this Journal, taken from *Annalen der Chem. und Pharm.*, July, 1860. In the second edition of my "Introduction to Practical Pharmacy," published at the close of the year 1858, the following remark from his pen occurs under the head of Tannic Acid:

"The concentrated ethereal solution contains 46.5 to 56.2 per cent. of tannic acid (Mohr), and is insoluble in ether. Could this be a chemical compound between oxide of ethyle and tannic acid? Thirteen equivalents of the former = 481, to one equivalent of the latter = 618, require exactly 56.2 per cent. of tannin and 43.8 per cent. of ether."

The experiments of Bolley seem to add an additional argument for this view of the composition of the very peculiar etherole of tannin, and render its numerical relations, as above expressed, still more interesting. Until the subject is further investigated, however, the supposed "Tannate of Ether and Water" must be held in abeyance; a demonstration of its existence and composition being placed among our *chemical desiderata*.

OLEUM GOSSYPII—(COTTON-SEED OIL.)

BY WILLIAM HENRY WEATHERLY, OF FREEHOLD, N. J.

(An Inaugural Essay presented to the Philadelphia College of Pharmacy, 1861.)

“The oil of the seeds of *Gossypium herbaceum*, and other species of the genus.

Sex. Syst. Monadelphia Polyandria. *Nat. Ord.*—Malvaceæ.”

“This is a biennial or triennial plant, and a native of Asia;” it is extensively cultivated throughout the Southern and South-western States, where it grows luxuriantly, frequently attaining a height of eight or ten feet, though it averages but five. With us it is an annual plant; the flowers, which are of a variety of colors, first appear in the month of June; the plant continuing to blossom, until the growth of it is checked by frost. The root consists of a main spindle, ten to twenty inches in length, from which numerous rootlets branch off. The leaves are described as being “five-lobed, one glandular beneath; lobes round, mucronate, involucre serrate; stem smooth.” At present the plant is cultivated, almost exclusively, for the fibre, which is found firmly attached to the seeds, but little use being made of any other portion. The picking season commences about the middle of August, lasting frequently as late as January; the fibre is stript from the seeds by the process of ginning, and is packed in bales, by aid of a screw press, when it is ready for shipment. This fibre or “lint” is the only portion of the plant officinal in our materia medica. It is used as an application for recent burns and scalds, also in the preparation of collodion.

The root has been spoken of by several writers as possessing emmenagogue properties. It was also reported as being much in use among the slaves, for the purpose of producing abortion; this I believe to be wholly untrue. During a clerkship of eighteen months, in one of the finest cotton-growing regions of the South, I made it a point to inquire into the truthfulness of this report. Not one of some twenty physicians, whom I asked, knew of a single instance where it had been used for or produced this effect. I also inquired of a number of overseers on large plantations, whether they knew of an instance where the

root had been used to produce abortion, but the information I acquired would in nowise substantiate this report.

That the root does possess emmenagogue properties, I do not presume to deny, but its efficacy as an "abortifacient," I certainly disbelieve.

The seeds as taken from the gin are of a grayish-brown color, owing to the short down which still adheres to them ; rub this off, and they are of a dark brown, almost black, color. Though long known to contain a large amount of fixed oil, yet until within a few years but little has been manufactured from them. On the plantation, they are used chiefly as fodder for cows in the winter. The oil is obtained by expression, the process and apparatus being similar to that for obtaining linseed oil ; the seeds are first deprived of their shells. Four qualities of this oil are found in our market, viz. : crude, clarified, refined and winter bleached. The crude constitutes the oil just as it runs from the mill ; it is thick, has a muddy appearance, and deposits upon standing a portion of its impurities. The clarified is comparatively pure, of a deep orange color, and quite limpid. The refined is a very pure oil, not quite so dark colored as the clarified, and very limpid. The winter bleached is of a pale straw color, has rather an earthy, though not very strong odor, and a sweet, bland, nut-oil taste, not dissimilar to that of sweet almond oil. The process of refining the crude oil is at present a secret among the manufacturers, so I am unable to give any account of it. The shelled seed yield about two gallons of crude oil to the bushel, and forty-five per cent. of oil cake. At Mobile, the seed as it comes from the gin, can be bought for twenty-five or thirty cents a bushel ; here at the mill, shelled, it is worth one dollar. The crude oil sells for fifty, the clarified sixty, the refined seventy, and the winter bleached eighty cents a gallon.

Cotton-seed oil is largely consumed in the manufacture of woollen goods, and is said to answer equally as well as any oil now in use. It is also adapted to the use of morocco dressers, by whom I am informed it is extensively employed. I learn also from good authority, that it makes a very fine soap, and is used by the fancy soap manufacturers, for that purpose. Although said to be a drying oil, my experience goes to prove

it is a very poor one. Last summer, we retailed a large quantity of it to the planters, for the purpose of oiling their gins, and they found it to answer admirably. We also used it in place of lard oil for lighting the store, and found it to give equally as clear and brilliant a light. The low price at which this oil can be procured, and a knowledge of the immense amount of seed (now put to so little purpose,) which might be bought up and manufactured into oil, are the inducements which led me to choose it as a subject for my thesis. The following experiments were conducted, with a view of ascertaining how far it is capable of substitution for the more expensive oils in our pharmaceutical preparations. The first made with it was unguentum aquæ rosæ, substituting it for oil of almonds; it made a perfectly smooth, white ointment, no way inferior to the officinal, and keeping equally as well. The second was ceratum plumbi subacetatis, substituting it for olive oil; the result was quite as satisfactory as the first. It made a much whiter cerate than the officinal, which generally has a greenish cast. I kept a specimen of this on hand several months without its undergoing any perceptible change. The third was unguentum hydrargyri nitratis, substituting it for neatsfoot oil; the result was a perfectly smooth, uniform ointment, of a rich orange color and of proper consistence. In making the ointment it was found necessary not to heat the oil and lard too hot, else, upon adding the nitrate of mercury, a deposit of a soft resinous consistence will be thrown down, evidently containing a portion of the mercury. Then, again, if the oil be too cold, no effervescence will occur upon adding the nitrate of mercury, and it will be found to remain too soft, almost liquid. I think citrine ointment, carefully made from this oil, will be found to keep its original color and consistence a great length of time. The fourth preparation made with it was emplastrum plumbi; for this some very pure litharge was procured, and the operation conducted with a great amount of care, but (though the result was a perfectly uniform plaster, in which every particle of the litharge was combined,) it would not acquire the proper consistence.

It was also substituted for olive oil in ceratum cetacei, linimentum ammoniæ, and l. camphoræ, making in each instance a preparation quite equal to the officinal. I learn from a reliable

source that olive oil is largely adulterated with cotton-seed oil. A friend of mine, largely engaged in the manufacture of plasters, purchased several casks of olive oil, which he found to be entirely unfit for his purpose, and upon examining it, was satisfied that about two-thirds of it consisted of cotton-seed oil. The specimen of oil, with which the preceding experiments were performed, is the winter bleached. Its specific gravity is .921 ; it is insoluble in alcohol, soluble in chloroform in all proportions, and in not less than its own bulk of ether. Sulphuric acid turns it of a deep red color, almost a brown. Nitric and hydrochloric acids have no effect upon it, either hot or cold. If the oil be heated much above its boiling point, it will take fire, and burn with a dull reddish flame, giving off but little smoke ; and if the heat is removed, the color of the flame will gradually change to a pale blue, similar to that of burning alcohol, and finally die out, leaving part of the oil unconsumed.

Though my facilities for experimenting, and the number of experiments performed, were necessarily limited, yet I think they are sufficient to prove that this oil would make a valuable addition to our officinal list. Here we have a domestic oil, which can be purchased pure, (there being no inducement to adulterate it,) at about one-half the price of olive oil ; and I see no reason why we should not make use of it, in every instance where it is capable of being substituted for that oil, instead of paying an exorbitant price for what we do not get ; as all will admit, two-thirds of our olive oil is adulterated.

SYRUPUS ASSAFETIDÆ.

By Jos. A. HEINTZELMAN.

As syrup of assafœtida is frequently prescribed by physicians, I had occasion to contrive a better plan for making it, than by rubbing the assafetida simply with hot water, and adding sufficient quantity of sugar to the strained saturated water. Such a process results in a turbid syrup, and after standing four weeks or longer, the resin, which partly has been held suspended, separates and collects on the sides of the bottle, and if shaken up disturbs altogether the elegance of a syrup.

The method which I use, to make the syrup in question, is

more satisfactory, producing a syrup equally strong, less penetrating in its odor and not changing or adhering to the bottle in which it is kept.

℞ Assafœtidæ, ℥iv.

Magnesiae carb., ℥vj.

Sacchari alb., ℥xv.

Aquæ ferventes, fl. ℥x.

Triturate the gum resin intimately with the carbonate of magnesia, then add 10 fluidounces of hot water in small portions, constantly agitating the mixture. Filter, and if the impregnated water should measure less than 8 fluidounces, add enough distilled water. Finally add 15 ounces white sugar, put on a water bath and dissolve at a moderate heat. Stir, and as soon as the sugar is dissolved, take the syrup from the fire, any further heating being injurious to the preparation.

A syrup so prepared is clear and transparent, and of a light straw color; its taste and odor is very distinct of the drug itself, and less unpleasant than the *mistura assafœtidæ*, or even the syrup prepared in former way.

Philadelphia, April 19, 1861.

GLEANINGS FROM THE FRENCH JOURNALS.

By THE EDITOR.

Biniiodide of Potassium.—Mr. Ernest Baudrimont (*Jour. de Pharm.*, Jan. 1861,) doubts the existence of this salt, and says that iodide of potassium, with an equivalent of iodine in solution, when agitated with sulphuret of carbon, is decolorized, leaving an aqueous solution of iodide of potassium, whilst the sulphuret of carbon is colored by the iodine which it holds in solution.

Nitrification.—Millon has observed that *nitre* is always produced with regularity, provided a humus product, an ammoniacal salt, and a mixture of earthy carbonates, are present, the solid mass being constantly moistened and exposed to the air. The action of the alkaline humate is to absorb oxygen, and this oxidation is transferred to the ammonia, which hereby becomes converted into nitric acid.

Coal Tar Soap.—M. Demeaux recommends this soap as a disinfectant. It is made by mixing equal parts of coal-tar, soap, and

rectified spirit, and heating on a water bath to complete solution. On cooling, a soap is obtained which is perfectly soluble in warm or cold water. The Academy of Sciences of Paris have appointed a committee to report on the above.

On the Saccharine substances of Acid Fruits.—M. H. Buignet (Jour. de Chim. Med., Feb. 1861, from Compt. Rend.) has arrived at the following conclusions in regard to this subject:

1. The original sugar of acid fruits is cane sugar $C_{12}H_{11}O_{11}$.
2. During the ripening, this sugar gradually becomes charged with a sugar identical with that obtained by the action of acids on cane sugar $C_{12}H_{12}O_{12}$.
3. At the period of maturity, the constitution of the saccharine matter varies with the fruit.
4. The cause of this variation is due, neither to natural acids nor to tannin contained in the fruits, but to a ferment analogous to that of beer.
5. There exists an affinity between this altered sugar and cane sugar which renders their separation very difficult.
6. The process which operates best is that of M. Péligot; it consists in forming a saccharate of lime, that is separated by ebullition and decomposed afterwards by a current of carbonic acid. It is in this manner that crystallizable sugar has been obtained from the peach, the apricot, the plum, the apple, etc.
7. Starch, the presumed source of this sugar, cannot be detected by iodine water or the microscope.
8. It seems represented by a particular principle which resembles tannin; it is perfectly isolable, and its proportion diminishes in measure as that of the sugar augments.
9. Green bananas always contain a great deal of starch and tannin. They disappear with maturity and are replaced by cane sugar.
10. There is, therefore, an essential difference between the processes of art and those of nature, in reference to the transformation of either starch or tannin into sugar; between the sugar of fruits created by natural maturization, and that which is the result of artificial ripening. The first is cane sugar, the latter altered sugar, (*sucre interverti*.)

On Sulphurous Powder. BY MARCELLIN POUILLET.—The formula of the Codex for the preparation of artificial sulphurous waters for drinking, is really inefficient and badly studied. The Academy of Medicine, on the report of M Robinet, has adopted the following formula, due to the researches of M. Marcellin Pouillet, which attains the triple object of a good preparation, keeping perfectly well and economical.

Sulphuret of Calcium,	Sulphate of Potassa,
Bi carbonate of Soda,	Gum Arabic,
Sulphate of Soda,	Acid Tartaric,

Equal parts of these substances, well dried, are reduced to powder and mixed.

Fifty centigrammes ($7\frac{3}{4}$ grs.) dissolved cold in a litre ($2\frac{1}{5}$ pints) of water, gives, after standing a quarter of an hour, a sulphurous water, which it is impossible to distinguish from the natural sulphurous waters.

The reaction which occurs between the different elements of this powder is easily understood. Tartaric acid and bi-carbonate of soda produce carbonic acid; and this acid, in the presence of sulphuret of calcium, gives rise to a disengagement of sulphuretted hydrogen gas, which is dissolved by the liquid. As all the sulphuret of calcium is decomposed, it results that the water is always identical when that compound is pure, and this is a condition essential to a good preparation.

The trials made by MM. Bazin, Cazenave, and Richet have given the most satisfactory results, and M. Bouchardat himself has prescribed with advantage this sulphurous powder.—*Répertoire de Pharm. Feb. 1861.*

On Bichloride of Tin as a Solvent. BY W. GERARDIN.—The solvent properties of bichloride of tin present many analogies with those of bisulphuret of carbon. It dissolves very nearly the same bodies, but in less proportions. At its boiling temperature it dissolves considerable quantities of octohedral sulphur, iodine and ordinary phosphorus. By cooling, the sulphur and iodine are deposited in beautiful crystals. The phosphorus separates in a liquid state, and solidifies without crystallizing. It dissolves amorphous sulphur after prolonged ebullition; the crystals which form by cooling, are octohedral; red phosphorus is

completely insoluble. It dissolves bromine and sulphuret of carbon in all proportions. It does not dissolve silicium, tellurium, arsenic, antimony, bismuth, tin, nor their oxides or chlorides.

GLEANINGS FROM GERMAN JOURNALS.

By Jno. M. MAISCH.

Mannite in the leaves of Ligustrum vulgare, Linn., was found and analyzed by A. Kromayer, who exhausted the leaves gathered in July by hot water, decanted, evaporated to one-half, precipitated by acetate of lead, removed from the filtrate the excess of lead by sulphuretted hydrogen, and obtained mannite from the liquid by crystallization. Poley showed the presence of mannite in privet in 1838.—(Arch. d. Pharm. cli. 281—284.)

Copper in snuff was detected by A. Hirschberg. He found in 1 zollpound, ($\frac{1}{2}$ kilogram.) .897, and in another sort 6.283 grs. copper, determined as oxide from the ashes.—(Arch. d. Ph. cli. 284, 285.)

An improvement of Liebig's condenser is proposed by Feldhaus, who suggests to bend a glass tube 8 feet in length, commencing about 13 inches from its upper end, in zig-zag form nearly at right angles, the whole being in the same plane, the length of each bend about five inches, and the first and last of half this length, so as to bring both ends in a straight line. The outer tube is made of tinned sheet iron; oval instead of round; the lower part receives the glass tube with its bends horizontal, and the ends fixed by means of corks; afterwards the upper portion is soldered on. The condensing surface is thus doubled.—(Arch. d. Ph. cli. 285, 286.)

Unripe figs contain a caustic juice which destroys the skin and produces violent inflammation of the eye. By boiling, a caoutchouc-like elastic mass is separated, which, when spread on paper or linen, reddens the skin, and produces pustules and erysipelas; spontaneous fermentation likewise separates it; the filtrate is then almost tasteless. This principle is soluble in alcohol, ether and fixed oils. The small figs are collected in March, carefully peeled, then immersed in water until they become soft

and finally boiled with sugar for preserves.—(Landerer, in Arch. d. Ph. cli. 299, 300.)

Scammony.—X. Landerer states that the root is first deprived of its juice by incisions, and afterwards boiled in copper vessels to gain an aqueous extract, which is mixed with the juice, not so much as an adulteration, but to render its strong drastic effects milder. He likewise reports the exportation to England of the root.—(Arch. d. Ph. cli. 300, 301.)

A volumetric estimation of nitrous acid has been experimented with by Feldhaus. He uses permanganate of potassa, which is added to an acid solution of the nitrite, the nitrous acid of which is oxidized to nitric acid, while protoxide of manganium is formed; the reaction is completed as soon as the acid solution retains the color of the permanganate. The most suitable temperature is 16 to 18° C. (61 to 65° F.) Spirit of nitrous ether may be analyzed in the same way if it is previously decomposed by alcoholic solution of potassa, heated to 212° F., and largely diluted with water. The above temperature must be preserved, but the result is not entirely accurate, because the brown products of decomposition produced by potassa, likewise deoxidize permanganic acid.—(Arch. d. Ph. clii. 34—41.)

Bitter yeast.—Landerer supposes the intense bitterness of a yeast of beer to have been produced by *nux vomica*, but inasmuch as no experiment confirmed this supposition, there appears to be not the slightest foundation for it.—(Arch. d. Ph. clii. 41, 42.)

Examination of extracts by their alkaloids.—Though he relates no examples, W. Gundermann recommends the following method for this purpose: the extract is rubbed with an equal weight of water, then agitated and set aside with four times the quantity of chloroform; the mixture is now gently heated to separate the chloroform, which is filtered, and the residue again treated with chloroform, all of which is evaporated. The alkaloid is dissolved in an acid, precipitated by ammonia, redissolved in alcohol, and evaporated spontaneously. Tinctures are previously evaporated to a syrupy consistence.—(Arch. d. Ph. clii. 43, 44.)

Poisoning by cyanide of potassium.—F. Venghauss obtained from the blood of a man who had died from accidentally drinking a solution of cyanide of potassium, free hydrocyanic acid, but found none therein in combination. The stomach was free from the free acid, a mixture of protosulphate and sesquichloride of iron having been given as an antidote, too late, however, to save life.—(Arch. d. Ph. clii. 138, 142.)

Hydrocyanic acid from Prunus padus.—Dr. O. Geiseler distilled from the fresh flowers, an equal weight of water and collected the distillate in 4 equal portions; 1 ounce of the first contained $\frac{1}{17}$, of the second $\frac{1}{23}$, of the third $\frac{1}{46}$, of the fourth $\frac{1}{69}$ and of the mixture $\frac{1}{35}$ grain of dry HCy. The leaves collected in July yielded a distillate containing $\frac{1}{6}$ gr. HCy in the ounce.—(Arch. d. Ph. clii. 143, 47.)

Deoxidation by protosalts of iron.—C. W. Hempel found, that protosalts of iron in connection with caustic alkalies reduce bichloride of platinum and of mercury to platinum black and to calomel, which remain behind after the subsequent treatment with muriatic acid. Iodic acid is reduced under the same circumstances, but the liberated iodine reacts with the excess of soda, forming iodate of soda and iodide of sodium, from which, by the addition of sulphuric acid, all the iodine is set free.—(Ann. d. Chem. u. Ph. xxxi. 97, 98.)

Ferridcyanide of potassium is obtained according to F. Reindel from ferrocyanide of potassium, sulphuric acid and binoxide of manganese; also from ferrocyanide of potassium and barium, bisulphate of potassa and the binoxide.—(Journ. f. prakt. Chem. lxxvi. 343.)

Behaviour of nascent hydrogen to organic compounds.—A. Genther found that sesquichloride of carbon $C_4 Cl_6$ is reduced to the protochloride $C_4 Cl_4$ in the presence of zinc and diluted sulphuric (not muriatic) acid. Bichloride of carbon $C_2 Cl_4$ is, under the same circumstances with sulphuric or muriatic acid, converted into chloroform $C_2 HCl_3$, and, by continued contact, into chloride of methylene $C_2 H_2 Cl_2$. Nitrobenzole $C_{12} H_5 NO_4$ yields anilina $C_{12} H_7 N$, and nitrous ether $C_4 H_5 O, NO_3$ is decomposed into little ethylamina and much ammonia.—(Ann. d. Ch. u. Ph. xxxi. 42—49.)

Piperidina and piperic acid have been obtained from piperina and alcoholic potassa by Von Babo and Keller; according to Strecker, the reaction is as follows: $\text{piperina } \text{C}_{34} \text{H}_{19} \text{NO}_6 + 2\text{HO} = \text{C}_{24} \text{H}_{10} \text{O}_8 \text{ (piperic acid)} + \text{C}_{10} \text{H}_{11} \text{N (piperidina)}$, and piperina has the composition $\text{N (C}_{24} \text{H}_9 \text{O}_6 + \text{C}_{10} \text{H}_{10})$.—(Annal. d. Ch. u. Ph. xxix, 317—320.)

Test for strychnia.—Rich. Hagen corroborates Von Sicherer's observation that the color produced by chromate of potassa and sulphuric acid is obscured, or does not appear with nitrate of strychnia in the presence of less or more tartaric acid or tartrates; the reaction is not prevented with free strychnia, nor with its nitrate, if binoxide of lead and sulphuric acid is employed.—(Annal. d. Chem. und Ph. xxvii. 159—164.)

Estimation of morphia.—1 equiv. of ferridcyanide of potassium is, according to Kieffer, reduced by alkaline solutions of morphia to the ferrocyanide, producing with sesquisalts of iron Prussian blue. This behaviour is recommended for the quantitative estimation of morphia in opium, by precipitating the meconic acid with chloride of calcium, using an excess of the ferridcyanide and determining the excess by strong hydrochloric acid; the liberated chlorine is now estimated by titration with hyposulphate of soda.—(Annal. d. Chem. u. Ph. xxvii. 271—283.)

The reaction of pentachloride of phosphorus upon camphor has been studied by Leop. Pfaundler. When equal equivalents are used, muriatic acid is evolved at 60°C. , and the yellowish liquid boils at 83°C. ; thrown in water, a white flocculent precipitate is separated, which is soft like wax, has a camphoraceous odor and crystallizes from alcohol in feathery crystals; its composition = $\text{C}_{20} \text{H}_{15} \text{Cl}$. With 2 equiv. of the chloride, the reaction is similar, but the precipitate is oily, and solidifies in a few days; composition: $\text{C}_{20} \text{H}_{16} \text{Cl}_2$. The first is neutral, the last deviates polarized light to the left.—(Annal. d. Ch. u. Ph. xxxix. 29—37.)

On chlorophyll.—Pfaundler made some experiments with various plants by growing them in distilled water, and feeding them with solutions containing no iron: at first green, they gradually became paler and sickly. The experiments confirm Salm-Horstmar's observations, that iron is requisite, not only for the pro-

duction of the green color, but also for the healthy development of plants. The chlorophylle obtained from about a hundred weight of grass, was freed from some resinous matter by dissolving in muriatic acid and precipitating with water; it contained 60.8C., 6.4H., and 32.8O, after deducting .037N and .0023 ashes which contained iron. Quercetin colored green by sesquichloride of iron, showed in some respects a similar, in others a different behaviour.—(Ann. d. Ch. u. Ph. xxxix. 37—45.)

Influence of cyanogen upon iodoform.—Gilm repeated St. Evre's experiments. A cold alcoholic solution of iodoform becomes reddish-brown by cyanogen, and gradually gelatinizes from the separation of floccules. If now, or from the beginning, heat is applied, the filtered liquid crystallizes, and the mass is silver-white, and possesses metallic lustre. By re-dissolving in alcohol, a few brown floccules remain undissolved, and the liquid yields golden yellow crystals. These and the former are iodoform containing a small portion of a cyanogenous body; bisulphite of carbon dissolves pure iodoform.—(Ann. d. Ch. u. Ph. xxxix. 46—49.)

Quercetine in buckthorn berries.—Professor P. Bolley obtains it by exhausting the berries with crude ether, evaporating the ether, precipitating with water, re-dissolving in alcohol and evaporating slowly; the crystals produce a brick red precipitate with sugar of lead and with nitrate of silver a blood red color, changing to violet, and finally reducing silver, the elementary analysis coincides with quercetine.—(Ann. d. Ch. u. Ph. xxxix. 54—59.)

Paraffine in boghead slate.—Merz obtained about $\frac{1}{2}$ per cent. by exhausting the alcoholic extract with ether and further purifying it. Prof. Bolley thinks it possible that paraffine is not found in coal tar, because it does not pre-exist in the coal.—(Ann. d. Ch. u. Ph. xxxix. 61—63.)

Tannin in ether.—Prof. Bolley reports the results of Ott on the behaviour of tannin to ether. Absolute ether dissolves at 5° C. (41° F.) .206 per cent., at ordinary temperature, .384 per cent. tannin; ether containing 1 per cent by volume of water dissolved at ordinary temperature 12 per cent. The solubility increases with the water, and the tannin on dissolving always turns brown

green. On continuing the addition of tannin, three clear, yellow or greenish yellow strata are obtained; the middle one is a solution of tannin in aqueous ether, the lowest one contained tannin, water and ether and may probably be a compound of tannin and ether.—(See Parrish's Pharmacy, page 377. Ann. d. Ch. u. Ph. xxxix. 63—67.)

Crystallized compounds of aluminium with metals, were obtained by Michel, on fusing tungstic acid or perfluoride of molybdenum with kryolite, aluminium and flux, and by fusing the respective chlorides with alkaline chlorides and aluminium. Most compounds are insoluble in cold diluted acids, all lose the aluminium by cold or hot solution of caustic soda. Their respective composition was found: Al_3Ti , Al_4W , Al_4Mo , MnAl_3 , FeAl_2 , NiAl_6 .—(Ann. d. Ch. u. Ph. xxxix. 102—105.)

Acids of benzoin.—Kolbe and Lautemann observed that different acids are contained in various kinds of benzoin. Some ordinary varieties and tears of unknown origin yielded benzoic acid, while the handsome tears from Sumatra, yielded an acid fusing under water to a clear colorless liquid, probably Strecker's toluylie acid.—(Ann. d. Ch. u. Ph. xxxix. 113.)

Acetate of soda, deprived in vacuo of its 6 equivs. water of crystallization, absorbs the same again on exposure to a moist atmosphere without materially altering its appearance. But if obtained in the anhydrous state by fusion or by exposure to 212°F . it may absorb 14 equiv., and crystallization will not take place, unless it is agitated or comes in contact with a solid body or a trace of the other dry acetate. The author, C. S. Reischauer, argues that the so-called supersaturated solutions might probably be viewed as solutions of the anhydrous salts.—(Ann. d. Chem. u. Pharm. xxxix. 116—120.)

Titration of iodine and bromine.—The solution of the mixed iodide and bromide is agitated with chloroform, until a little, about the size of a hazlenut, remains undissolved; chlorine water of known strength is added, until the blue color of the chloroform just disappears, when 6 equivs. Cl. have been used for 1 eq. I. By more chlorine water, the chloroform turns yellow, orange yellow, and yellowish-white, when 2 Cl. have been used for 1 Br.; with 6 Cl. the yellowish white tint disappears very slowly. The

difficulty to observe the proper shade of color renders this estimation of bromine not very exact, but sufficiently so for all technical purposes.—(A. Reimann in Ann. d. Ch. u. Ph. xxxix. 140—143.)

GLEANINGS—DOMESTIC AND FOREIGN.

BY THE EDITOR.

Note on Ants in Texas.—S. B. Buckley, in the Proceedings of the Academy of Natural Sciences of Philadelphia, for Jan. 29, 1861, gives an interesting account of the Cutting Ant (*Myrmica Texana*) of Texas. Speaking of their habitations or “cities,” he remarks: “During the summer I have measured some which extended beneath a surface having an average diameter of 70 feet; and in one instance their town was spread beneath an area of about 100 feet. Their cellars, from six inches to two or three feet in diameter, are beneath this surface to the depth of from 12 to 18 feet. The dirt brought up is in the form of a crater, to the edge of which they carry the ground excavated, where it is dropped, and rolls down the sides of the volcano-like hill, which is seldom more than 18 inches high. The storms level the hills, and new ones are formed on them, until the dirt excavated is sometimes three feet deep.” From these residences various lateral subterranean avenues extend to the surface in various directions. It is well known that they store up large quantities of food in the form of grain and other seeds, leaves, &c. They do most of their work at night, especially in the hot season. They can carry the largest grains of corn; and Dr. Buckley, to test their extraordinary powers, tried them with small bits of lead dipped in molasses, which, though three or four times the size of the ants, after much struggling they “succeeded in getting the sweetened metal on their backs, when they marched homeward.” They avoid salted provisions. They appear to have a distinct superior class of “big headed” giants, who are apparently rulers, who punish and obtain submission. They avoid low ground, subject to overflow.

The Stinging Ant (*Myrmica malefaciens*) occupy similar cellars and are particularly destructive to grain.

Value of the Black Currant.—The *Druggists' Circular*, for April, quoting from a French Journal, informs us that since 1841, at Dijon in France, about two millions of bushes of the Black Currant have been planted with a view to wine making. In some places the grape has given way to this current. Each bush yields about 2 to 5 lbs. of fruit, and the profits of an acre vary from \$100 to \$200. The bushes are planted in trenches four feet three inches apart, and fifteen inches deep, the plants being placed some distance asunder.

Gun Cotton.—A writer in the *Archiv. der Pharm.* Dec. 1861, says that it is more difficult to prepare good Gun Cotton for either collodion or explosive purposes, in proportion as the quantity operated upon exceeds an ounce, it being conditional of success that the evolution of red nitrous vapors be prevented, which he finds almost impossible on a large scale.

The proportion found best by the writer was 16 ounces of nitre and 24 ounces of oil of vitriol for each ounce of cotton. He also approves of the temperature of from 150° to 160° F. with five minutes contact, and thorough washing with hot water.—*Druggists' Circular*, April, 1861.

Lithium in fertile soil.—Prince Salm-Horstmar, (*Pogg. Annalen*,) in studying the effects of various salts in contributing to fertility, finds a salt of lithia the most successful. As lithia is now believed to be of almost universal occurrence in soils and ashes, this fact has considerable interest.—*Druggists' Circular*, April, 1861.

Ozone in the Mineral Kingdom.—Prof. Schroetter of Vienna, (*Pogg. Annalen*, 1860, p. 561,) says that the odor of certain varieties of minerals when scratched is due to this substance.—*Druggists' Circular*.

The inflammability of the flowers of Dictamnus albus, alleged by the daughter of Linnæus, and so frequently doubted since by other observers, has been corroborated by Dr. Hahn, of Hanover, (*Archiv. der Pharm.* 1861,) who found that in a dry season, when a lighted match was held to the stalk below a bunch of flowers, a small reddish strongly smoking flame ran up which did

no injury to the plant, and produced an intensely aromatic odor. The flame is due to a secretion of the nature of volatile oil from glands below the base of the flower, which secretion does not appear until just before the petals fall.—*Druggists' Circular*.

Dr. Torrey's Herbarium.—Through the Amer. Med. Times, we learn that Dr. Torrey has presented "his immense *herbarium*, the fruit of forty years assiduous labor, together with his valuable botanical library," to the Trustees of Columbia College, who have provided accommodations for them, and also a residence for Dr. Torrey in the College. This collection is said to embrace examples of nearly all the collections of Government expeditions, from that of 1819, under Major Long, to the recent results. Besides, the collection embraces numerous specimens from the Floras of Europe, Asia, Australia and South Africa. Dr. Torrey does not propose abandoning his botanical pursuits, but hopes, under the auspices to the College, to prosecute them under more favorable circumstances.

Detection of Castor Oil in Volatile Oils.—H. N. Draper proposes to identify this oil when used to adulterate the volatile oils by its quality of yielding œnanthylic acid by the action of nitric acid. Twenty drops of the suspected oil, in a capsule, is heated until deprived of aroma. To the residue, if any, add five or six drops of nitric acid, and as soon as the reaction has subsided, dilute with solution of carbonate of soda. If castor oil is present, the unmistakable odor of œnanthylic acid is evolved.—*Dub. Med. Press and Chem. News*.

Antipathy of Snakes to Garlic and Tobacco.—According to Dr. Landerer of Athens, (*Buchner's Repert.*) the gardeners of Greece resort to the plan of strewing bruised garlic over their melon and cucumber patches, before collecting their fruit to drive out the snakes which harbor there.—*Druggists' Circular*.

Production of intense cold.—By the forcible passage of dry air through a number of small tubes dipping into very volatile liquids, MM. Loir and Orion have succeeded in producing intense cold. With about seven ounces of ether, a temperature of -34° F. can be attained, by which sulphurous acid gas may

be liquefied; and if this liquid sulphurous acid be used -50° F. is attainable, and when liquefied ammonia is used as the cooling agent, the thermometer indicates -87° which is sufficient to liquefy carbonic acid gas under the ordinary pressure.—*Druggists' Circular*.

Boettger's method of bleaching sponge.—The softest and cleanest sponges are selected, washed and squeezed out repeatedly in water. They are plunged in dilute hydrochloric acid (1 part of acid and 6 parts of water), in order to separate the calcareous matters. This immersion is for one hour. They are then carefully washed and plunged into a second bath of dilute hydrochloric acid prepared as the first, except that there is added 6 per cent. of hyposulphite of soda dissolved in a little water. The sponges are suffered to remain in this bath for 24 hours. A final washing with water removes the chemical substances, and the sponges acquire by this method a beautiful whiteness.—*Chemist and Druggist, from Rep. de Pharmacie*.

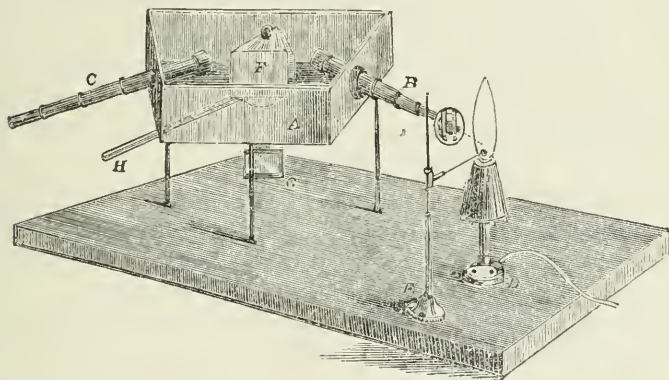
Breeding of Tapeworm.—Dr. Butler, (Med. and Surg. Reporter, March 30, 1861), states that Mr. Kuchenmeister has again succeeded in demonstrating that the *Cysticercus cellulosa* becomes metamorphosed into the *Tænia solium* of man. A man under sentence of death, was induced to eat some pork containing Cysticerci. The culprit was executed on March 31st, 1860; and on post mortem examination one half of the Cysticerci swallowed were found to have become converted into flat worms. Eleven tape worms, with perfectly developed joints, were found in the intestines, the largest measuring five feet.

PROFESSORS BUNSEN AND KIRCHOFF'S METHOD OF CHEMICAL ANALYSIS BY SPECTRUM OBSERVATIONS.

This exquisite method of qualitative analysis is founded on the power possessed by many substances of developing peculiar bright lines in the spectrum of a flame in which they are introduced. The bright lines produced in this manner show themselves most plainly when the temperature of the flame is highest and its illuminating power least: hence Bunsen's gas-burner

which gives a flame of very high temperature and very slight luminosity, is well adapted for experiments on the bright lines of the flame-spectra produced as above described.

The apparatus employed by Messrs. Kirchoff and Bunsen in their spectrum observations is thus represented and described in *Poggendorff's Annalen*, (Bd. cx. § 161):—



A is a box blackened on the inside, having its horizontal section in the form of a trapezium, and resting on three feet; the two inclined sides of the box, which are placed at an angle of about 58° from each other, carry the two small telescopes B and C. The eye-piece of the first telescope is removed, and in its place is inserted a plate, in which a slit made by two brass knife-edges is so arranged that it coincides with the focus of the object-glass. The gas-lamp D stands before the slit in such a position that the mouth of the flame is in a straight line with the axis of the telescope B. Somewhat lower than the point at which the axis of the tube produced meets the mouth, the end of a fine platinum wire bent round to a hook is placed in the flame. The platinum wire is supported in this position by a small holder E, and on to the hook is melted a globule of the dried chloride which it is required to examine. Between the object-glasses of the telescopes B and C is placed a hollow prism F, filled with bisulphide of carbon, and having a refracting angle of 60° ; the prism rests upon a brass plate, moveable about a vertical axis. The axis carries on its lower part the mirror G, and above that the arm H, which serves as a handle for turning

the prism and mirror. A small telescope placed some way off is directed towards the mirror, and through this telescope an image of a horizontal scale fixed at some distance from the mirror is observed. By turning the prism round every color of the spectrum may be made to move past the vertical wire of the telescope C, and any required position of the spectrum thus brought to coincide with the vertical line. Each particular portion of the spectrum thus corresponds to a certain point on the scale. If the luminosity of the spectrum is very small, the wire of the telescope C may be illuminated by means of a lens, which throws a portion of the rays from a lamp through a small opening in the side of the tube of the telescope C.

From a long series of preliminary experiments with this apparatus, the authors satisfied themselves that the appearance of certain bright lines in the spectra may be regarded as absolute proof of the presence in the flame of certain metals, and that they serve as reactions, by means of which these bodies may be recognized with more certainty, greater quickness, and in far smaller quantities, than can be done by help of any other known analytical method, no matter what may be the nature of the body with which the metals are combined.

The wonderful delicacy of the spectrum-reaction of *sodium* is evinced by the following experiment, which the writer had the good fortune to witness in the laboratory of Professor Bunsen, in Heidelberg. In a far corner of the experiment room, the capacity of which is about 60 cubic metres, (one cubic metre = 35.3 cubic feet,) was burnt a mixture of 3 milligrammes (0.0462 gr.) of chlorate of sodium with milk sugar, whilst the non-luminous flame of the lamp was observed through the slit of the telescope. Within a few minutes the flame, which gradually became pale and yellow, gave a distinct yellow sodium line, coincident in the solar spectrum with Fraunhofer's dark line D, lasting for about ten minutes, and then entirely disappearing. From the weight of the sodium salt burnt, and the capacity of the room, it was calculated that in one part by weight of air, there was suspended less than $\frac{1}{20000000}$ of a part of soda smoke. As the reaction can be quite easily observed in one second, and as in this time the quantity of air which is heated to ignition by the flame could be calculated from the rate of issue, and from

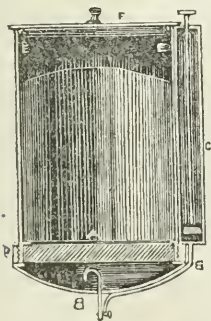
the composition of the gases of the flame, the surprising result came out that the eye is able to detect with the greatest ease quantities of sodium salt less than $\frac{1}{3000000}$ of a milligramme in weight. The reaction of *potassium* is not nearly so delicate; the spectrum contains only two characteristic lines, one in the outermost *red*, and the other far in the *violet* ray of the solar spectrum—points at which the eye ceases to be sensitive to the rays. The presence, however, of $\frac{1}{1000}$ of a milligramme of the metal could be readily detected. *Lithium* gives two sharply defined lines—the one a very weak *yellow* line, and the other a bright *red* line, both towards the extreme red end of the solar spectrum; though the reaction is not so sensitive as with sodium, it is by far the most delicate test for the metal, the eye being capable of distinguishing with absolute certainty a quantity of carbonate of lithium less than $\frac{9}{10000000}$ of a milligramme in weight. The authors found to their surprise that lithium, instead of being a rare substance, was a very widely-distributed one, occurring in almost all bodies. They found it in the water of the Atlantic; in the ashes of marine plants; in pure spring water; in the ashes of tobacco, vine leaves, and of grapes; and even in the milk of animals fed on crops growing in the Rhine plain, on a non-granite soil. *Strontium*, *barium*, and *calcium* all give characteristic spectra; that of *strontium* is characterized by the absence of *green* bands. It contains, however, eight remarkable ones, namely, six *red*, one *orange*, and one *blue* line. To examine the intensity of the reaction, Kirchhoff and Bunsen threw up into the air of the room, in the form of fine dust, 0.077 grm. of chloride, and thoroughly mixed the air by rapidly moving an umbrella; the line immediately came out, and realized the presence of the $\frac{6}{100000}$ part of a milligramme of strontium. The *barium* spectrum is distinguished by two very distinct *green* lines, by which the authors were enabled to detect with certainty $\frac{1}{1000}$ of a milligramme of the metal. *Calcium* gives a broad and very characteristic *green* line, and, moreover, a bright *orange* line lying near the red end of the spectrum. $\frac{6}{10000000}$ of a milligramme of the chloride of the metal could be easily detected. It is particularly worthy of note that the spectra-reactions of different metals do not interfere with one another; that each being cha-

racterized by some one or more special lines, it is easy to make a qualitative analysis of a compound containing several elements: thus, Kirchoff and Bunsen were enabled to exhibit the reactions of *potassium*, *sodium*, *lithium*, *calcium*, and *strontium*, in several mineral waters; to show the bands of *sodium*, *potassium*, *lithium*, and *calcium* in the ash of a cigar moistened with hydrochloric acid, and to point out differences in the composition of various limestones. But the greatest triumph of the new method of analysis was the discovery of a fourth member of the group of alkali metals. While working on the residue of a mineral water from Kreuznach, a spectrum was obtained which gave lines as simple and characteristic as those of lithium and sodium, but which were *blue*, and were not referable to any known element; these indefatigable chemists evaporated down no less a quantity than *twenty tons* of the water, and obtained 240 grains of the platinum salt of the new metal, which they call *caesium*, from the Latin word *caesius*, signifying grayish blue, that being the tint of the two spectral lines which it shows. The new metal is very analogous to potassium, but differs from it in the solubility of its nitrate in alcohol. Its equivalent number is 117, being exactly three times that of potassium. It is scarcely possible to overrate the probable importance to chemical science of this new and beautiful method of analysis. "In spectrum analysis," observe the authors, "the colored bands are unaffected by any alteration of physical conditions, or by the presence of other bodies. The positions which the lines occupy in the spectrum, indicate the existence of a chemical property as unalterable as the combining weights themselves, and may therefore be estimated with almost astronomical precision; it extends almost to infinity the limits within which the chemical characteristics of matter have hitherto been confined. By an application of the method to geological inquiries, the most valuable results may be expected; it opens out, moreover, the investigation of an entirely untrodden field, stretching even beyond the solar system, for in order to examine the composition of a luminous gas, we require, according to this method, only to see it; and it is evident that the same mode of analysis must be applicable to the atmosphere of the sun and of the brighter fixed stars."—*Chemist and Druggist*, Feb. 15th, 1861.

DAHLKE'S FILTER FOR CHEMICAL LIQUIDS.

The filtering medium patented by Mr. Dahlke was noticed by us at considerable length in a former number.* We are glad to learn that the favorable estimate we expressed respecting its value is likely to be brought to a very extended trial, Mr. Dahlke having organized a company for the purpose of working out the patent to the fullest extent. The managers have already received orders to fit up the whole of the General Post Office with filters similar to those supplied to the Drinking Fountain Association.

But our immediate object is an ingenious adaptation of the material to the purification of chemical liquids, for which it is more especially adapted, as being composed of silica and carbon; it is unacted upon by any ordinary re-agents; and possessing the capability of being made of any required porosity, it can be used in filtering to any required degree of mechanical purity. In ordinary cases, a separate filter is required for each liquid that has to be purified, entailing a necessity for a considerable number of filters. The inconvenience, which is very great when many liquids have to be dealt with, is entirely obviated by the ingenuity of Mr. Dahlke; as he has devised a plan, shown in the annexed engraving, by which one filter will answer for a considerable number of liquids; all that is requisite being to remove the block of silicated carbon and replace it by a second, or even by another filtering substance.



Thus one block of the filtering medium can be kept for each liquid, or for each class of liquids; and, hence, used with economy, and without the chance of contaminating a simple medicine with any other of a poisonous or acrid character.

To produce rapid action, a syphon, B, is employed, which is brought into action by means of a syringe, C, attached to it and the vessel. Therefore, neither quantity nor weight of the liquid to be filtered will have any influence on the rapidity of the filtration.

The lower part of the vessel by being screwed into the upper part, as shown by D, fixes the solid filtering medium, which arrangement allows us to change the latter as often as may be required, and, thus, special filter blocks can be kept for certain valuable liquids.

The apparatus is supplied with a lid, F, to prevent evaporation.

We regard this as one of the most ingenious and practical improvements that have been made for filters for some time, and doubt not that it will come into very general use.—*Chemist and Druggist*, Jan. 15, 1861.

ON THE MATURATION OF FRUITS.

BY MM. BERTHELOT AND BUIGNET.

The changes which fruits undergo during ripening constitute the most remarkable phenomena of vegetable physiology. Nothing is more interesting than to see fruit lose, little by little, its astringent and acid flavor, and acquire the sweet and agreeable taste which renders it fit for food. This change is especially worthy of attention in the case of a fruit detached from the plant on which it was developed. In this case, in fact, the fruit constitutes a complete medium, which derives nothing more from the plant which formed it, all the ulterior changes it undergoes resulting from the reciprocal metamorphoses of its own materials. It is under such conditions that we may hope to study most simply the play of these metamorphoses; to comprehend, for instance, the laws presiding over the formation of vegetable acids and over the saccharine principles.

We have undertaken to make a series of inquiries on this subject, the first results of which we now lay before the Academy. The results were obtained two years since, during the winters of 1858 and 1859. Our reason for mentioning these dates is to show how slow and laborious such researches are; the exact innumerable analyses and experiments, which can only be carried on from year to year, because certain conditions of these experiments are supplied by Nature and cannot be produced at will. In this first paper we propose mainly to develope, by a special example, the methods we employ and the end we have in view, not, however, pretending, as yet, to give definite results.

We have experimented on the common orange, one of the fruits which most distinctly shows the period of maturation. The structure of the orange, the clear distinction between its various parts, the thickness of its rind, which effectually isolates its juice, and, lastly, the relatively rapid period of its artificial maturation, offer especial facilities for observation.

The chemical composition of the juice of the orange adds to these facilities. In fact, the juice is principally composed of citric acid, fermentable sugars, and nitrogenous principles. The gelatinous substances analogous to pectin, which play so important a part in the maturation of certain other fruits, as M. Fremy's researches have shown, exist in the orange, on the contrary, in very insignificant proportions.

The following is our method of operating :—We take a certain number of green oranges, susceptible of the ripening process, and distribute them in two series, one comprising the riper oranges, the other, those less ripe, putting aside a few from each series for analysis. We then leave them for a few weeks in a dry place, maintained at a gentle temperature. At the expiration of this time, if the maturation is effected, we repeat the analysis.

In each of these analyses we have effected the following determinations :—

1. Weigh each orange.
2. Separate it into four parts, viz., rind, seeds, juice, and pulp. Weigh these four parts, and determine the quantity of water and residue, fixed at 100° C., they contain.
3. Determine how much azotised and mineral matter, soluble in ether, the dried rind contains.
4. Determine how much azotised and mineral matter is contained in the pulp.
5. Pursue the same plan with the seeds, after determining the number and the mean weight.
6. Estimate the quantity of water, citric acid, inverted sugar, cane sugar, and azotised and mineral matter contained in the juice.

Relying on these determinations, the total composition of the orange may be ascertained with sufficient exactitude, and the variations undergone by the principles it contains compared.

This comparison leads to divers interesting results, to which we shall presently advert, with further details. The only facts we desire at present to adduce are those relating to the sugary principles. We give them, moreover, as the results of the two series of comparative analyses which we have just indicated, not, however, pretending as yet to generalize them. The questions are too delicate to be decided upon without certain reservations.

1. The orange, either before or at the period of its maturity, contains, at the same time, cane and inverted sugar.

2. The relative proportions of these two sugars change during maturation; the quantity of inverted sugar, which was previously greater than that of the cane sugar, ceases to preponderate; the relations change, and the cane sugar is found to be the most abundant.

3. The weight of inverted sugar varies little.

4. The weight of cane sugar augments relatively to the total weight of the orange.

5. It increases equally, whether compared with the total weight of the juice or with the weight of the fixed matters contained in the juice.

From these facts, it is easy to understand why the orange becomes sweeter during maturation. The formation of cane sugar in the ripening fruit is here the most striking phenomenon. It is the more interesting, since it is effected in an acid medium; not only does the citric acid appear not to act in inverting the cane sugar already formed,—an inactivity which could be foreseen as a result of the experiments made by one of us,—but it does not oppose the augmentation of the cane sugar itself.

We are now continuing our experiments, in order to strengthen these first results by new studies, and to seek out at the expense of what principles cane sugar is formed.—*Chem. News, London, Feb. 23, from Comptes-Rendus, vol. li.*

PAPER FROM INDIAN CORN LEAVES.

Recent experiments have proved Indian corn to possess not only all the qualities necessary to make a good article, but to be in many respects superior to rags. The discovery to which

we allude is a complete success, and may be expected to exercise the greatest influence upon the price of paper. Indian corn, in countries of a certain degree of temperature, can be easily cultivated to a degree more than sufficient to satisfy the utmost demands of the paper market. Besides, as rags are likely to fall in price, owing to the extensive supply resulting from this new element, the world of writers and readers would seem to have a brighter future before it than the boldest fancy would have imagined a short time ago.

This is not the first time that paper has been manufactured from the blade of Indian corn; but, strange to say, the art was lost, and required to be discovered anew. As early as the seventeenth century an Indian corn paper manufactory was in full operation at the town of Rievi in Italy, and enjoyed a world-wide reputation at the time; but with the death of its proprietor the secret seems to have lapsed into oblivion. Attempts subsequently made to continue the manufacture were baffled by the difficulty of removing the flint and resinous and glutinous matter contained in the blade. The recovery of the process has at last been effected, and is due to the cleverness of one Herr Moritz Diamant, a Jewish writing-master in Austria; and the trial of his method on a grand scale, which was made at the Imperial manufactory of Schlogelmulhe, near Glognitz, Lower Austria, has completely demonstrated the certainty of the invention. Although the machinery, arranged as it was for the manufacture of rag-paper, could not, of course, fully answer the requirements of Herr Diamant, the results of the essay were wonderfully favorable. The article produced was of a purity of texture and whiteness of color that left nothing to be desired; and this is all the more valuable from the difficulty usually experienced in the removal of impurities from rags. The proprietor of the invention is Count Carl Octavio Zu Lippe Wessensfeld; and several experiments give the following results:

1. It is not only possible to produce every variety of paper from the blades of Indian corn, but the product is equal, and in some respects even superior, to the article manufactured from rags.

2. The paper requires but very little size to render it fit for writing purposes, as the pulp naturally contains a large propor-

tion of that necessary ingredient, which can at the same time be easily eliminated, if desirable.

3. The bleaching is effected by an extraordinarily rapid and facile process; and, indeed, for the common light-colored packing paper, the process becomes entirely unnecessary.

4. The Indian corn paper possesses greater strength and tenacity than rag paper, without the drawback of brittleness, so conspicuous in the common straw products.

5. No machinery being required in the manufacture of this paper for the purpose of tearing up the raw material and reducing it to pulp, the expense, both in point of power and time, is far less than is necessary for the production of rag paper.

Count Lippe having put himself in communication with the Austrian Government, an Imperial manufactory for Indian corn paper (*maishalm papier*, as the inventor calls it) is now in course of construction at Pesth, the capital of the greatest Indian corn growing country in Europe. Another manufactory is already in full operation in Switzerland, and preparations are being made on the coast of the Mediterranean for the production and exportation on a large scale of the pulp of this new material. — *American Druggists' Circular, from London Daily Telegraph.*

THE CHROME MINES OF CHESTER COUNTY, PA.

A correspondent of the West Chester Jeffersonian, writing from Hopewell Borough, thus describes the Chrome Works in that vicinity:

Some six miles southwest of this place lie the famous chrome mines, familiarly known as "Wood's Chrome Banks." They and a tract of land are owned by a Mr. Tyson, of Baltimore, Md., properly styled the "Chrome King." To these quarries or mines we paid a visit during the last season, when there were upwards of 70 hands employed in and about the mines, independent of those engaged in hauling the chrome to market. There are two shafts sunk from which the ore or mineral is taken. They have descended to the amazing depth of three hundred feet. The mouths of the shafts have nothing dissimilar in their appearance to that of an ordinary well, probably a little wider. They descend perpendicularly some 75 feet, then strike off in an

oblique direction for a distance, then perpendicularly again, and so on to the bottom of the pits, the men being, as we are told, some fifty yards further south at the bottom than at the entrance. The chrome is drawn up by mule power. Two buckets about the size of a flour barrel are attached to a rope at each end. While one is being emptied, the other is being filled. Some 300 yards distant is the mill for grinding the chrome preparatory to barrelling it. Here they have a water-power excelled by few, having the advantage of all the water of the "Octoraro Creek," if needed. From here there is a shaft that runs (connected by machinery to the mill) to the mine, and there attached to pumps for the purpose of pumping the water from the pits. Strangers are at liberty to descend to the pits, having a torch and a man to lead the way for them; but the "trip" down is a dangerous one, requiring care and caution, as the rounds of the ladder are continually wet and slippery. Owing to the continual drippings, it is a most beautiful place to get a suit of clothes spoiled, and those desiring to see the wonders of underground work had better prepare themselves with an oil-cloth suit. The magnitude of the business done here cannot be well comprehended by the mere reading of a meagre description of it. This is said to be the richest vein in the known world.

Chrome ore is composed of the oxide of iron and chromic acid. This is the acid of all the salts called "chromates," that are now very extensively used in the arts. Chromic acid possesses the remarkable property of igniting ether when brought into contact with it; and some method may yet be employed for using it in the manufacture of igniting compounds as a substitute for phosphorus and the chlorate of potassa. Chromic acid combined with potash is the most common form in which it is used in the arts. In this relationship it is called the bichromate of potash; its color is a deep orange, and in form it is a beautiful crystalline salt. It is used as a mordant for coloring black on wool, and for making black ink when combined with logwood; it colors orange and yellow on cotton goods, and the oxyd of chrome is a common green pigment employed in lithographic; copper-plate, and steel-plate printing. Its green color is very permanent, and this quality renders it well adapted for printing bank notes for which purpose it is now much used. The oxide

of chromium, when reduced to fine powder is one of the best reducing and polishing substances for metals known, and which we think is even superior to the finest emery for polishing steel. The best iridium pointed gold pens become useless when used for writing signatures for a few hours over the green chrome ink that is printed on bank bills.—*American Druggists' Circular from Mining Chronicle.*

GLYCERINE POMADE OF IODIDE OF POTASSIUM.

BY M. THIRAULT.

This formula is published by the French *Societe d' emulation des pharmaciens de l'est.* It is as follows:

Glycerine (sp. gr. 25 to 30)	grammes	1000.
Sapon. animal. pulv.	“	50.
Potass. ioidid. pulv.	“	130.

Dissolve in a water-bath, pour immediately into a warm marble mortar, and triturate briskly for a quarter of an hour. It is then aromatized with two grammes of essence of bitter almonds.

This pomade can be preserved for a very long time without alteration, and should be ranked among officinal medicines. As the iodine salt is present in a state of perfect solution, we can readily understand that it would be rapidly absorbed. There is no repugnance to its employment with any one, since it can be made to resemble in its appearance, consistence and odor, an agreeable cosmetic. It neither colors the skin nor the linen. These are all valuable qualities entitling it to a place in the therapeutic arsenal.—*Répertoire de Pharm.—Journ. and Trans. of the Maryland College of Pharm.* L. H. S.

ON THE MYRONATE OF POTASH FROM BLACK MUSTARD.

BY MM. H. LUDWIG AND W. G. LANGE.

We know, from the researches of M. Bussy, that black mustard does not contain the essential oil ready formed, but that it is produced, in the presence of water, by the action of the myrosine on a particular salt—the myronate of potash. The re-

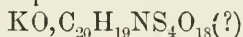
sults of M. Bussy have been confirmed by other authors, who have added several facts relating to the composition and decomposition of the myronate of potash.

To prepare this salt in the state of crystals we commence by macerating the black mustard in two successive portions of rectified spirit and then in two portions of cold water. The myronate is contained in the aqueous liquors. These are evaporated to a syrupy consistence, and the residue heated with weak spirit. The liquid becomes turbid on cooling. It is filtered and concentrated, when a deposit of crystals of myronate of potash takes place. These may be purified by a second crystallization. Five hundred grammes of black mustard have given by this process one gramme of colorless crystallized myronate of potash; 1500 grammes have given 7.5 grammes.

One hundred parts of myronate of potash contain :—

Carbon	.	.	.	.	29.98
Hydrogen	.	.	.	.	4.91
Nitrogen	.	.	.	.	3.97
Sulphur	.	.	.	.	14.93
Oxygen	.	.	.	.	34.92
Potash	.	.	.	.	11.29
					<hr/>
					100.00

These numbers correspond to the formula—



When we treat the myronate of potash with recently-prepared myrosine (aqueous extract of white mustard), a strong odor of essential oil of mustard is manifested. The reaction does not give rise to the disengagement of gas. When it has terminated, if we submit the aqueous liquid to distillation, the essential oil of mustard passes over with the water, and a milky acid liquor remains in the retort. This liquid holds sulphur in suspension. It contains some sulphate of potash in solution; but the sulphate equals only a fourth of the sulphur present in the myronate. Evaporated, the liquid in question leaves a residue from which weak spirit extracts some fermentable sugar. When this is converted into alcohol, if we boil the fermented liquid with a few drops of sulphuric acid neutralize with chalk, and add yeast, a fresh fermentation takes place; proving that a new portion of

sugar was formed under the influence of the sulphuric acid. The total quantity of sugar ($C_{12}H_{12}O_{12}$) formed amounts to 44.99 per cent. of the weight of the myronate of potash employed. The myronate, when submitted to the action of yeast, yields no carbonic acid.

In the aqueous solution of myronate of potash, nitrate of silver forms, after some time, a white precipitate. On boiling, this is dissolved, but a black precipitate of sulphide of silver soon forms, and a strong odor of oil of mustard is at the same time manifested. The oil is formed then under these conditions, without the intervention of the myrosine.—*London Pharm. Journ. April, 1861. from Annalen der Chemie, Jan.*

A NEW SALT OF IRON AND QUININE.

(Communicated by Dr. FERGUS, of Marlborough College, to the Medical Times and Gazette, March 17.)

It is generally found that a salt of the protoxide of iron is preferable to one of a higher degree of oxygenation; but it is also difficult to obtain an absolutely permanent salt of the protoxide. Perhaps, without exception, the sulphate is the most practically useful of all the salts of iron, owing to the uniformity of its composition. Of the quinine salts, the sulphate is also the most available for general purposes. It is not difficult to form a simple combination of these two sulphates, but the resulting compound is not well fitted for general use. The addition, however, of a certain proportion of sulphate of magnesia, enables us to obtain a salt which is nearly as soluble as the sulphate of magnesia itself—quite unalterable in the solid state, and forming a solution perfectly clear at first, and remaining so for an indefinite period. The iron has no tendency to a further state of oxygenation; the solution has been agitated with oxygen gas, and kept in contact with it for several days, without the least change. A solution of gallic acid tinges a solution of the salt of light bluish color after the lapse of two or three days, and many substances which produce an inky compound with the salts of iron may be mixed with it without causing any change of color.

The proportion of the three sulphates which has been adopted,

is 80 per cent. of sulphate of magnesia, 15 per cent. of sulphate of iron, and 5 per cent. of sulphate of quinine, one scruple containing 16, 3, and 1 grains of the respective salts. These proportions have been found the best for general use, and also for the purposes of manufacture. The proportion of quinine may be increased by prescribing an additional quantity which is readily soluble in the solution of the salt.

One peculiarity is especially deserving of notice; that in this combination the assisting or adjuvant property of both iron and quinine are remarkably developed, the effect of both, particularly of quinine, being heightened in a very marked manner. At the same time, both of the remedies are less apt to disagree with peculiar constitutions which ordinarily refuse to tolerate either iron or quinine. If the heightened power be borne in mind in prescribing this combination, there will be very few cases found in which it will be not be suitable whenever either iron or quinine are indicated.—*London Pharm. Journ. April, 1861.*

THERAPEUTIC STUDIES ON ESSENCE OF VALERIAN.

BY M. BARAILLER.

The following conclusions have been attained by Barailler ;

1. Employed in the case of a healthy man, the essence gives rise to several symptoms, the principal of which are, intellectual sluggishness, drowsiness, deep sleep, reduction in number of arterial pulsations ; and, later, an increase and an abundant flow of urine.

2. Given to a sick man, it modifies, in a prompt and rapid manner, the symptoms—stupor, somnolence, coma from some dynamic cause, which complicate severe fevers.

3. This modification is obtained by administering from 50 centigrammes to 1 gramme (from 10 to 20 drops) of the essence in 24 hours.

4. The action of this remedy can only be explained by the employment of the law of similitude, enunciated by Hippocrates and by a number of the ancient authors.

5. Certain nervous conditions, such as vertigo, hysteria, essential asthma, &c., are modified in a remarkable manner by the volatile oil of valerian, which, under the results of a series of new experiments, is capable of extending the sphere of therapeu-

tic applications of this plant very much.—*Journ. and Trans. Md. Col. Pharm. March, 1861, from Répertoire de Pharm.* S.

THE PRODUCTS OF THE DISTILLATION OF ROSIN.

By J. SCHEIL.

The product of the first action of heat on rosin is a mobile liquid of a yellow color, and strong but not repulsive odor; at a higher temperature a thicker iridescent liquid of less agreeable odor, the rosin oil, is obtained.

By repeated fractional distillation the first yields two liquids. One, named *Colophonon* by the author, is colorless, very mobile, of strong refracting power, spec. grav. = .84 at 74° C., and boiling point = 97° (206° F.) It is miscible with concentrated sulphuric acid to a brown liquid, from which water separates a green stratum, resembling thyme and rosemary in odor; hydrochloric acid has a similar result; nitric acid yields a brown resin, and potassium, with the evolution of gas, a brown mass, turning yellow. After heating above its boiling point, with the atmosphere excluded, it has an odor of peppermint. Its composition is $C_{22}H_{18}O_2$, the density of its vapor 5.1.

The second liquid is greenish yellow, boils at 160° C. (320° F.) and has the odor and other properties of oil of turpentine; it is probably identical with Deville's terebene. Both liquids are neutral to polarized light.

The crude rosin oil showed the composition $C_{30}H_{20}O$; the refined, which was not iridescent, after remaining in contact with lime for 24 hours, = $C_{40}H_{28}O_2$.

The gases, eliminated by the dry distillation, were collected at three different periods. The atmospheric oxygen and nitrogen in the retort remained nearly in the same relative proportion; the first portion of the gases contained 14.96 per cent. carbonic acid, 11.48 per cent. carbonic oxide, and 5.89 per cent. elayle and ditetryle. Towards the close, the free oxygen had nearly disappeared, carbonic acid increased, and a little marsh gas was present; the presence of propylene could not be proved. Notwithstanding a long condensing tube was employed, the gases retain a portion of the liquid hydrocarbons, and it is probable that the disagreeable odor of the light-gas is due to such a body.

—*Ann. d. Chem. u. Ph.*, xxxix. 96—102.

J. M. M.

ON THE PREPARATION OF LIQUOR POTASSÆ.

BY THEOPHILUS REDWOOD, Ph.D.

Professor of Chemistry and Pharmacy to the Pharmaceutical Society.

[NOTE.—The following remarks are taken from an elaborate paper by Dr. Redwood, in the March number of the Pharmaceutical Journal. After discussing the history and some points involved in the process, Dr. Redwood recommended the following process as yielding uniform and satisfactory results.—EDITOR.]

Liquor Potassæ.

Take of Carbonate of potash,
Hydrate of lime, each $\bar{3}$ viiss.
Distilled Water, Oiv.

Mix the slaked lime with three pints of the water, and put the mixture into a green glass stoppered bottle (a Winchester quart). Dissolve the carbonate of potash in the remainder of the water, and add this solution, in small quantities at a time, to the milk of lime, shaking the bottle for some minutes after each addition; and when the whole of the ingredients have been thus mixed, continue the agitation until a portion of the filtered liquor no longer evolves carbonic acid gas on the addition of an excess of hydrochloric acid. Then filter the solution through calico.

This process differs from that of the present London Pharmacopœia—1st, in the substitution of cold water for boiling water; 2d, in the substitution of hydrate of lime for quick lime; 3d, in the use of an increased quantity of lime; 4th, in the reduction of the quantity of solution ordered to one half (from a gallon to half a gallon). These alterations are important. Thus, by using cold water instead of boiling water, all difficulties in conducting the process, including the selection of a suitable vessel in which to mix the ingredients, are removed. A green glass stoppered bottle, the most appropriate apparatus for the purpose, may be employed, and as the quantity ordered is half a gallon, a Winchester quart bottle, which every druggist has in his store-room, will just hold this quantity. By ordering the lime to be weighed in the state of hydrate, the use of bad lime, and the impurities which accompany it, is to a great extent precluded. By increasing the quantity of lime, provision is made

for the production of the compound of carbonate and hydrate of lime already alluded to, after allowing for some impurity which will be retained even in the hydrate of lime, and also for uncombined water which may be present. Lastly, by reducing the total quantity ordered in the formula, such a quantity is indicated for an operation as can be easily subjected to the active and continued agitation required to effect the complete decomposition of the carbonate of potash within a moderately short time. When good hydrate of lime is used, the decomposition may be effected in about half an hour by continued and very active agitation.

The ingredients being confined in a stoppered bottle, which is itself a measure of the quantity, there are but few probable sources of error in the process or of defect in the product, provided the solid ingredients be in a sufficient state of purity and accurately weighed. If from any cause the process when commenced cannot receive continued attention up to its completion, no evil will arise from the ingredients being left at rest until another opportunity for shaking the bottle presents itself. It must not be supposed, however, that such periods of rest contribute much, if anything, to the decomposition of the carbonate of potash by the lime, as the latter quickly subsides to the bottom of the vessel, and then, of course, ceases to produce any effect upon the carbonate of potash contained in the solution above it. I have found the agitation of the mixture to be most easily effected by placing the bottle on its side, with a folded cloth under it, on a table, and rolling it to and fro with a short quick motion, one hand of the operator being placed over the stopper of the bottle. In operating thus without heat there is not much probability of the stopper becoming fixed in the mouth of the bottle, unless the process be protracted; if, however, the solution has to be kept for any length of time in a well-stoppered bottle, it will be found advantageous to put a piece of thin gutta percha tissue between the stopper and the mouth of the bottle, which will effectually prevent the adhesion of the stopper, which otherwise often occurs. A small quantity of the solution must be filtered from time to time to test it for carbonic acid, and when it has become nearly caustic the filtration of even a drachm or two cannot be well effected through paper without causing the

latter to break, but a small calico filter will be found fully to answer the required purpose. When the solution is found to be perfectly caustic it may either be filtered at once through calico or linen, or the precipitate may be allowed to subside and the clear liquor decanted off. In the latter case, some days should be allowed for the subsidence of the precipitate, the particles of which will become more and more aggregated, thus occupying a smaller space and leaving a larger amount of supernatant liquid. The aggregation of the precipitate will thus take place in time to nearly the same extent as occurs more quickly when the ingredients are boiled together. If the solution be filtered, this may, and indeed should, be done before the precipitate has aggregated into a hard mass at the bottom of the bottle. It does this after standing for some time, and is then removed with difficulty. A calico or linen filter should be used, as neither of these are sensibly acted upon by the caustic solution, especially after they have been once used. When new, a little color is taken from them, and more particularly from the linen, but this is removed by the first portion filtered, or the effect may be prevented by previously washing the filter with some caustic alkali, and the same filter may be afterwards employed repeatedly without any further contamination of the liquid. The filtration will take place most rapidly through the conical filter-bag, commonly called *Hippocrates' sleeve*, which, when used for this purpose, instead of having a hoop to keep the mouth open, should be merely provided with a wide hem having three equidistant openings to admit three pieces of straight glass rod passed through the hem from one opening to another, and these must be long enough to project a little way out of the openings in each direction. Three cords with loops placed over these projecting ends will afford the means of suspending the bag when in use, and on afterwards withdrawing the rods the bag may be easily washed and put away until again required. If it should be thought that this method of filtration would expose the solution too much to the air, a piece of calico or linen may be cut to the form of an ordinary filter, and placed in a funnel covered with a common plate, the neck of the funnel being inserted into the mouth of a green glass bottle intended for the reception of the liquid. In the filtration of Liquor Potassæ, it is

important that the precipitate as well as the solution should be put into the filter. In fact, it is the precipitate that forms the most efficient filtering medium; without it the liquid would not pass through clear; but if the whole of the precipitate be turned into the bag or other filter with the liquid, the latter will almost immediately run through sufficiently clear for use. This filtration or percolation of the liquid through the precipitate also serves to effect the decomposition of any remaining portion of carbonate of potash, if there should be such. I have sometimes completed the decomposition in this way by passing the solution through the precipitate several times, and have found it an expeditious mode of operating.

Liquor Potassæ prepared by this process will be as free from impurity as the nature of the substances used for its production will admit. The alumina always present in the lime, although dissolved to a considerable extent in the early part of the process, before the decomposition of the carbonate of potash is complete, is ultimately precipitated by the excess of lime with which it forms a compound insoluble in the cold. To some extent this precipitation is effected when heat is employed; but in operating with heat, a little alumina is retained in solution. In this case, even repeated agitation after the liquor has cooled does not entirely remove the alumina, unless some fresh milk of lime be added.

The absence of alumina is an important feature in the Liquor Potassæ made by the cold process, and one that will be appreciated by those who have occasion to use it for chemical purposes. To ensure the absence of this contamination, however, it is essential that excess of lime should be used, and this is one of the objects contemplated in augmenting the quantity of lime ordered, and endeavoring to ensure its good quality.

The silica which commercial carbonate of potash contains, will be dissolved by the caustic alkali, and this constitutes one of the usual impurities of Liquor Potassæ. It is stated by some authors that, in the process of boiling, the silica forms an insoluble compound with lime, and is thus removed; but I do not find that this separation is complete. There is a little silica retained in solution, whichever process is adopted, and I cannot discover any difference in the quantity present in solution prepared from the same materials by the different processes.

There are thus, I think, several advantages which attend the preparation of *Liquor Potassæ* by the process I have described. This process is more easily performed than any of those contained in our *Pharmacopœias*, and it is less likely to yield products of variable strength and quality. There is one point, however, to which attention must be particularly paid, and that is the condition of the carbonate of potash. I have assumed that the so-called salt of tartar of commerce, which the London College orders, is to be used in the process. This, according to the *Pharmacopœia*, is a sesquihydrated carbonate, containing sixteen per cent. of water; but as it rapidly absorbs more water on exposure to the air, it cannot be relied on as a definite compound in the state in which it is met with in commerce. Unless it be perfectly dry, and does not in the least adhere to the bottle containing it, it should not be used without being previously heated with constant agitation in a porcelain dish placed over a water-bath. It is readily tested with regard to the water it contains by the means indicated in the *Pharmacopœia*. One hundred grains of it, on being heated to redness, should lose sixteen grains.

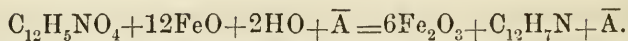
The proposed formula for *Liquor Potassæ* is so constructed that, if troy weight be used, the solution will be identical in strength with that now ordered in the London *Pharmacopœia*, but if the avoirdupois ounce be substituted for the troy ounce, the strength of the solution will be slightly reduced, so that one hundred grain-measures of it will contain five grains of anhydrous potash (KO), and the specific gravity of this solution will be 1.053.—*London Pharm. Jour.*, March, 1861.

ON THE PREPARATION OF ARTIFICIAL COLORING MATTERS WITH THE PRODUCTS EXTRACTED FROM COAL TAR.

By M. E. KOPP.

(Continued from page 136.)

3. *Reduction of Nitrobenzole by Ferrous Acetate.*—Ferrous acetate reacts on nitrobenzole and converts it into aniline, while the sulphate, chloride, and oxalate of iron have no action on it. The reaction is represented by the formula—



One part of nitrobenzole is placed in a retort with an aqueous solution of acetate of iron. The retort is then heated over a water-bath for several hours, and then the contents are filtered—being diluted with water if they have become pasty. The residue left on the filter, which is principally hydrated peroxide of iron, is washed with boiling water. The filtrate and washings are then distilled, the condensed products being water, acetic acid, and acetate of aniline. These may be again distilled with strong sulphuric acid (using four-tenths the weight of the nitrobenzole employed) to recover the acetic acid and form sulphate of aniline, and the latter may be decomposed by caustic potash and the aniline distilled off. This process has not been found advantageous, and has consequently been given up.

4. *Reduction of Nitrobenzole by means of Arsenite of Potash or Soda.*—This process was invented by Wohler. He digested nitrobenzole with a solution of arsenious acid in a strong ley of caustic soda, or placed the arsenical solution in a tubulated retort, heated it to the boiling point, and then allowed the nitrobenzole to fall in drop by drop. Under these circumstances nitrobenzole is transformed into aniline which distils over, and it is only necessary to saturate with an alcoholic solution of oxalic acid to obtain perfectly pure oxalate of aniline.

The last method of forming aniline we shall quote, is that of Schlagdenhausen, who has shown that it is produced when nitrobenzole and sulphide of carbon are heated together in a sealed tube to 160°.

PROPERTIES OF ANILINE.*—Aniline when pure is a colorless liquid, very astringent, having an aromatic odor, and an acrid burning taste. It is slightly soluble in water, and very soluble in alcohol and ether. Its sp gr. = 1.028; at —20° it does not freeze. It boils at 182°, and distils unchanged. When warmed, it dissolves sulphur and phosphorus. It is a powerful base, combining with acids to form salts, which in general are soluble. It decomposes ferrous and ferric salts, and the salts of zinc and alumina, precipitating from them the metallic oxides. It also

*Gerhardt, *Chimie Organ.* iii. p. 84.

precipitates the chlorides of mercury, platinum, gold and palladium; but it does not precipitate the nitrates of mercury and silver.

Aniline easily oxidizes, turning yellow in water, and in time becoming resinified.

When aniline dissolved in hydrochloric acid is acted on by chlorine the solution takes a violet color, and on continuing the current of chlorine the liquid becomes turbid, and deposits a brown-colored resinoid mass. On submitting the whole to distillation, vapors of trichloraniline and trichlorophenic acid pass over.

A solution of the alkaline hypochlorites colors aniline a violet blue, which passes rapidly to a pale red, especially in contact with acids.

A mixture of hydrochloric acid and chlorate of potash act on aniline, the final result of the action being chloranile $C_{12}Cl_4O_4$, but in the course of the reaction several colored intermediary bodies are formed.*

If a solution of chlorate of potash in hydrochloric acid be added to a solution of a salt of aniline mixed with an equal volume of alcohol, and care is taken to avoid an excess of the hydrochloric solution, a flocculent precipitate is deposited after a time of a beautiful indigo blue; this precipitate filtered and washed with alcohol contracts strongly, and the blue color passes to a deep green. The filtered liquid has a brownish-red color; on boiling it, adding fresh quantities of hydrochloric acid, and chlorate of potash, a yellow liquor is obtained which deposits crystallised scales of chloranile.

An aqueous solution of chromic acid gives with solutions of aniline a green, blue or black precipitate according to the concentration of the liquors.

When a small quantity of an aniline salt is mixed in a porcelain dish, with a few drops of strong sulphuric acid, and a drop of a solution of bichromate of potash is allowed to fall on the mixture, a beautiful blue color appears after some minutes, which, however, soon disappears.

Dilute nitric acid combines with aniline without altering it

*See *Chem. News*, vol. ii. p. 195.

immediately; but after some time nitrate of aniline crystallizes in the form of concentric needles, the mother liquor turns red colored, and the sides of the capsule become covered with a beautiful blue efflorescence. When a few drops of strong fuming nitric acid are poured upon aniline it is immediately colored a deep blue; on applying heat the blue tint quickly passes to yellow, a lively reaction is manifested, which results in the formation of picric or trinitrophenic acid.

Potassium dissolves in aniline, disengaging hydrogen, whilst the whole becomes a violet colored pap.

The other reactions of aniline, which are characterised by the formation of aniline, fuchsine and azaline, will be related in a future number, when describing the processes for the preparation of these substances. But before commencing these we may just glance at some of the properties and derivatives of binitrobenzole.

Binitrobenzole, as before stated, is formed when nitrobenzole is added drop by drop to a mixture of equal parts of fuming nitric acid and sulphuric acid as long as the liquids will mix. If such a mixture be boiled for a few minutes it becomes on cooling a thick magna of binitrobenzole, which is easily purified by repeated washings with water. A single crystallization from alcohol will furnish the body in long brilliant prisms which melt at a temperature above 100° , and crystallize again on cooling, in a radiated mass.

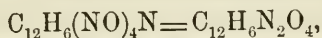
Binitrobenzole is very soluble in warm alcohol. When a plate of zinc well cleaned is placed in a cold alcoholic solution of binitrobenzole and hydrochloric acid is added by degrees, we observe that the disengagement of hydrogen, which at first takes place, soon ceases, and at the same time the liquid gradually takes a crimson-red tint.* The reaction being completed, the excess of zinc is removed and the liquor is saturated by an alkali, which precipitates the oxide of zinc colored a deep purple. The precipitate is collected on a filter and washed with alcohol. By distilling the highly colored alcoholic washings, washing the residue with cold water, then redissolving it in alcohol and evaporating it afresh to dryness, the new matter is obtained perfectly pure. The authors have given it the name

*Church and Perkin, *Quart. Journ. Chem. Soc.* ix. p. 1.

of nitrosophenyline. It has the formula $C_{12}H_6N_2O_2$. When obtained as above, it is a black, shining, substance; when heated, it fuses and decomposes directly: it is almost insoluble in water, but freely soluble in alcohol and acids. An alcoholic solution containing only 0.2 per cent. is so deeply colored that by reflected light the solution seems opaque and of an orange red.

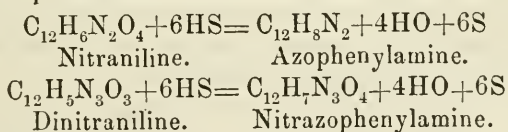
Concentrated hydrochloric acid and dilute sulphuric and nitric acids form magnificent crimson red solutions with nitrosophenyline, which is precipitated from them again unchanged by alkalies.

Binitrobenzole treated with an alcoholic solution of sulphide of ammonium is at first converted into nitraniline,—



that is to say aniline, in which one equivalent of hydrogen is replaced by one of nitrous vapor. Nitraniline crystallizes in yellow needles which stain the epidermis like picric acid.

There is a second aniline compound in which two equivalents of hydrogen are replaced by two equivalents of nitrous acid, dinitraline = $C_{12}H_52(NO_2)N$. By the prolonged action of sulphuretted hydrogen and ammonia on nitraniline and dinitraniline two new bases are produced,—*azophenylamine* and *nitrazophenylamine*. The following equations express the re-actions which take place:—



The second of these bases, nitrazophenylamine, merits some attention, inasmuch as it offers some resemblance to the colored derivatives of aniline. It is prepared in the following manner: * Dinitraniline is boiled for two hours with a great excess of sulphide of ammonium. The liquid soon becomes dark red; the yellow crystals of dinitraniline disappear, and are succeeded by a network of delicate needles, of a deep red color, the quantity of which is much increased on cooling the liquid after the

*Gerhardt, *Chimie Organ.*, iii. p. 105; Gmelin's "Handbook," xi. p. 294.

reaction has terminated. Oxalic and hydrochloric acids dissolve the nitrazophenylamine, leaving the precipitated sulphur, and also a secondary crystallized product of a dirty green color. The base may be obtained pure by precipitating a boiling oxalic or hydrochloric solution with ammonia and re-crystallizing two or three times from a solution in hot alcohol. In this way nitrazophenylamine is obtained in long slender needles, united in groups, having a clear red color when dry, and showing a golden iridescence. Water, alcohol, and ether easily dissolve it, and the concentrated solutions are of a deep red color. It melts at a high temperature, and the greater part is volatilized apparently without alteration. Heated suddenly, it slightly explodes, leaving a carbonaceous residue.

The salts of nitrazophenylamine are very beautiful compounds, characterized by a dichroism which causes a peculiar iridescence in reflected light. All the salts must be crystallized in the presence of an excess of acid, since both water and alcohol decompose the neutral salts.

Fuschine prepared by chloride of tin, according to the process of MM. Renard and Franc, appears to be the hydrochlorate of a base, the properties of which greatly resemble those of nitrazophenylamine. The crystallized salts show the same colored reflections, and are decomposed (in part at least) by water and alcohol, the solutions being of a deep red color.

We now proceed to notice the processes for the preparation of coloring matters by means of aniline, and the method of employing them for dyeing fabrics and yarns.

The first on the list is that of Mr. Perkin, for the preparation of aniline, violet or mauve. A cold solution of sulphate of aniline (rough aniline is used) and a cold solution of bichromate of potash are mixed together and left for ten or twelve hours. An abundant deposit of a black powder is thus obtained, which is separated, well washed with water, and lastly, dried at 212° . The dried substance is then digested several times with naptha or commercial benzole, which dissolves a brown tarry or resinous substance, contaminating the coloring matter in the deposit. The residue insoluble in the naptha is dried again, and then digested with wood spirit or alcohol, or any other liquid able to dissolve the coloring matter. This clear solution is decanted

and distilled to recover the solvent. The residue of the distillation is aniline, or aniline violet.

Mr. Perkin gives the following directions for dyeing with aniline :—To dye a lilac or a purple, an alcoholic solution of the coloring matter is added to a boiling dilute solution of oxalic and tartaric acids, and when the mixture has cooled, the materials to be dyed (silk, cotton, &c.,) are to be completely immersed in the bath. Mr. Perkin's patent is dated August 26, 1856. In the early part of 1859, M. Verguin, a chemist at Lyons, while experimenting with aniline, discovered a process for converting it into a magnificent purple-red coloring matter. M. Verguin sold his process to MM. Renard and Franc, who patented the process in France, on the 8th of April, 1859, and gave the new coloring matter the name of Fuchsine. The process is as follows :—A mixture of ten parts of aniline with six or seven of anhydrous chloride of tin is boiled for fifteen or twenty minutes. The mixture at first turns yellow, then becomes reddish, and ends by assuming a beautiful red color when seen in thin layers ; in the mass it appears black. Water is now added, and the whole is heated to ebullition. It is then removed from the fire, allowed to rest a moment for some insoluble matters to deposit, and then filtered while still hot ; the residue is exhausted by another boiling with water. The filtered liquor contains the coloring matter in solution. To separate it, advantage is taken of its being insoluble in a saline solution ; accordingly, chloride of sodium or a neutral tartrate of potash or soda, in a solid state, is added to the liquor, and as the salt dissolves, the coloring matter is deposited. It may then be separated by decantation or filtration.

Fuchsine may be employed for dyeing either in aqueous solution, without a mordant, or with the ordinary saline or acid mordants, always excepting the mineral acids, which alter the color.

A red color is also obtained by acting on aniline with other anhydrous metallic chlorides, bichloride of mercury, perchloride of iron, protochloride of copper, for example. In October, 1859, MM. Renard and Franc added to the above three anhydrous chlorides, the hydrate of bichloride of tin, as being equally able to change aniline into fuchsine. A second addition to their

patent, in November, 1859, extended the list of colorigenous agents, by including the stannous and stannic sulphates, the mercurous and mercuric sulphates, the mercurous and mercuric nitrates, nitrate of silver, titanio chloride, mercuric fluoride, stannic and mercuric bromides, and stannic iodide. A third addition, in the same month, added the ferric and uranic nitrates, uranic chloride and mercuric chlorate, bromate, and iodate. Sesquichloride of carbon and iodoform were afterwards added in December of the same year. Lastly a fifth addition was made in February, 1860, the purport of which the author does not exactly know, but which, he believes, includes iodine, arsenic acid, and nitric acid.

We must here quote from a paper by Dr. Hofmann, presented to the Academy of Sciences, on September 20th, 1858,* and entitled, "Contributions to the History of the Organic Bases, iv. Action of Bichloride of Carbon on Aniline:"—*

"At the ordinary temperature of the air, aniline and bichloride of carbon do not act on each other. At 100° C. the mixture begins to change; but after digesting for some days, the change is far from being complete. By submitting, however, a mixture of one part of bichloride of carbon and three parts of aniline, the two bodies being in the anhydrous state, to a temperature of 170° or 180° (the boiling point of aniline) for nearly thirty hours, the liquid is changed into a blackish mass, soft and viscous, or hard and brittle, according to the duration of the temperature. This blackish mass is a mixture of several bodies. By exhausting with water a part is dissolved, another part remaining insoluble in a resinous state. With the aqueous solution potash gives an oily precipitate, which contains a considerable proportion of unchanged aniline. On distilling this oily matter with diluted potash, aniline passes; while a viscous oil, which solidifies by degrees, remains behind. Repeated washings with cold alcohol, and one or two crystallizations from boiling alcohol, render the body perfectly white and pure; a very soluble substance of a *magnificent crimson color* remaining in solution.

The blackish portion of the mass which remains insoluble in water, is easily dissolved by hydrochloric acid; from this solution it is again precipitated by alkalis, as a dirty-red amorphous powder soluble in alcohol, and forming a *rich crimson colored solution*. The greater part of this coloring matter is the same as that which accompanies the crystalline fatty body, considerable quantities of this latter substance being sometimes found in the product insoluble in water."

The great resemblance between the experiments of Dr. Hof-

* *Comptes-Rendus*, t. xlvii. p. 492.

mann and the process of MM. Renard and Franc is evident. If, as appears from the fourth addition to their patent, fuchsine may be prepared by boiling sesquichloride of carbon with aniline, it is quite clear that Dr. Hofmann had fuchsine in his hand, and that it is identical with the substance which gave a magnificent crimson solution. It is right, however, to add, that if Dr. Hofmann was the first who obtained fuchsine as a secondary product in his theoretical experiments, M. Verguin has certainly the merit of having modified the process, so as to make it capable of industrial application.

In October, 1859, M. Gerber-Keller patented in France the preparation of a red coloring matter, which he called Azaleine, "by means of aniline treated under the influence of heat, and in proper proportions with several salts which are formed by the oxyacids of nitrogen, sulphur, chlorine, bromine, and iodine with metallic oxides." We shall complete this too concise and consequently obscure description of the process by adding what is known respecting the preparation. The salts preferred by the author are the mercurous and mercuric nitrates. Aniline is carefully heated to about 150° C., and nitrate of mercury in powder is then dropped in, a small quantity at a time. A higher temperature than 150° must be avoided, or the action becomes too violent, and the coloring matter destroyed. At every addition of the mercury salt a sort of ebullition is produced, the consequence of the reaction which takes place; metallic mercury is deposited at the bottom of the vessel, and the liquor gradually acquires a deep crimson color. After being decanted, the whole is allowed to cool, and the coloring matter is now washed with a little water and dried. It is then freed from tarry matters by repeated washings with commercial benzine, and finally dissolved in alcohol or wood spirit, the solution being re-precipitated with water, &c., again and again until the product is sufficiently pure. Absolute purity is not necessary for either dyeing or printing.

Azaleine is soluble in water, but much less so than in alcohol. For dyeing silk and wool, alcoholic solutions are preferred; for printing on cotton, a dilute alcoholic is thickened with gum.

We have recently heard that the process now employed by M. Gerber-Keller is the following:—10 parts of aniline are

heated on a water-bath to 100° , and 7 parts of mercuric nitrate, dry and in powder, are added by degrees. The mixture is maintained at the temperature of 100° for eight or nine hours, in which time the mass will have become of a magnificent violet-red color. On cooling it forms a thick paste. The greater part of the reduced mercury is found at the bottom of the vessel. To employ the azaleine then produced as a dye or for printing, it is only necessary to treat the pasty mass with boiling water, a mixture of water and alcohol, acetic acid, or any other solvent, and make use of the solution.

The advantage of the last process consists in the moderate heat required, a high temperature seeming to cause the formation of tarry matters.

M. Albert Schlumberger has also described (*Bulletin de la Société Industrielle de Mulhouse*, March 1860, p. 170) a process for converting aniline into a red coloring matter by means of the neutral nitrate of mercury. He takes 100 parts of anhydrous aniline, and 60 parts of the nitrate of mercury, and heats the mixture to boiling. The mass slowly changes color, at first becoming brown, but in time the whole is transformed into a beautiful red liquid. The operation is finished when the boiling materials are observed to swell up and disengage yellowish vapors. The mass so obtained is washed with two or three times its volume of boiling water, to remove the oils which are not completely metamorphosed, and then boiled two or three times with water to extract the coloring matter.

In this process, as well as in the preceding, the whole of the mercury is recovered.

In May, 1860, MM. Girard and Delaire obtained a patent for the use of arsenic acid in the preparation of a red coloring matter from aniline. They introduce into a distillatory apparatus 12 parts of dry arsenic acid and 12 parts of water. When the hydration of the arsenic acid is complete, they add 10 parts of aniline, and shake the whole well together. The mass becomes homogeneous, pasty, and almost solid. A gentle heat is then applied, so as to raise the temperature of the mixture gradually. The mass now becomes liquid. When the operation is properly conducted, only water and a very small quantity of aniline distil. At 120° a great part of the aniline

is changed into the coloring matter, and care must be taken to keep the mixture at this temperature for some time. The heat may then be increased, but it must never pass 160° . The operation lasts four or five hours.

In the above way a perfectly homogeneous mass is obtained, which is fluid above 100° . On cooling it solidifies, and has the appearance of a hard, brittle substance, with a bronze lustre. It is very soluble in water to which it communicates a pure red color, so deep that concentrated boiling solutions appear black. The solutions may be used for dyeing directly without fear, for the tissues will not retain a trace of the arsenic. If necessary, the arsenic may be easily removed from the coloring matter by one of the following processes:—

1. Powder the rough product and treat it with strong hydrochloric acid; then dilute with water, and saturate the clear solution with a slight excess of soda. The coloring matter is precipitated, while the arsenic remains in solution in the alkali, and it is only necessary to wash the precipitate once or twice with cold water to obtain the coloring matter quite pure.

2. The rough product dissolved in water is treated with a quantity of quick lime corresponding to the arsenical compounds it contains, *plus* a slight excess. The coloring matter is precipitated, as well as the arsenical compounds,—the latter in the form of insoluble calcareous salts. The liquor and the precipitate (unseparated) are now treated with carbonic, acetic, or tartaric acid, either of which will dissolve the coloring matter and leave the arsenic.

In this process aniline gives about its own weight of coloring matter.

The process of MM. Depouilly and Lauth, “for the manufacture of various colored products derived from aniline,” is very similar to that of Mr. Perkin. They take a solution of a salt of aniline and treat it with a solution of chloride of lime. The first drops of the chloride produce a violet coloration, and, on continuing the addition of the re-agent, a deep violet precipitate is formed, which constitutes the coloring matter. This is collected and washed with slightly acidulated water. When the washings are uncolored, the precipitate is collected on a fil-

ter, and drained. It is then dissolved in a strong acid—sulphuric, for example—and re-precipitated by the addition of a large quantity of water, or by an alkaline solution. The product is thus obtained sufficiently pure for sale. For dyeing and printing, alcoholic, acid, or aqueous solutions may be used, according to the nature of the article to be dyed and the purity of the color required.

The next patents referred to by the author are those of Messrs. Beale and Kirkham, Mr. Kay, Mr. Price, and Mr. G. C. Williams, which have been already described in the *Chemical News*, (vol. i. pp. 9, 74, 81.)

(To be continued.)

PLASMA PLUMBI.

BY CHARLES S. TILYARD.

Read before the Maryland College of Pharmacy, Feb. 14th, 1861.

In a former number of the *Journal* the writer suggested a combination of Goulard's extract of lead with glycerine (glycerole of lead) as a substitute for Goulard's cerate.

The fluidity of that compound has been found an objection to its application in some cases, and has led him to modify it by combining the extract with plasma. The result is a preparation of the consistence of an ointment which may be modified at pleasure by increasing or diminishing the quantity of starch or arrow root.

Take of Glycerine,	. . . . .	2 fluid ounces.
Sol. subacetate of lead,	. . . . .	3 " drachms.
Camphor,	. . . . .	10 grains.
Bermuda arrow root,	. . . . .	1½ drachms.

Rub the arrow root into a fine powder and having mixed the glycerine and extract of lead, stir it into the mixture. Pour the whole into a capsule and heat over a spirit lamp *cautiously, constantly stirring*, until it becomes transparent, and assumes the consistence of paste. Having powdered the camphor by means of a few drops of alcohol, rub a little of the plasma with it in

a mortar until well incorporated, then add the remainder, and stir a few minutes.

When first made, it is viscid and ropy, but in a day or two loses these properties, and becomes at the ordinary temperature (say 60° F.) of the consistence of a soft ointment.—*Journ. and Trans. of the Maryland College of Pharmacy, March, 1861.*

ON BERBERINA AND ITS SALTS.

BY L. HENRY.

The author prepared the alkaloid by Fleitmann's process, and adds to its known properties that it has no action on polarized light, and that it readily yields supersaturated solutions; its composition is $C_{42}H_{19}NO_{10}$. The following salts were prepared and analyzed:

Hydrobromate of berberina is slowly precipitated by the acid from an aqueous solution of the alkaloid, and crystallizes from alcohol in pale yellow needles, soluble in water and alcohol; when dried between 100 and 110° C. (212 and 230° F.) the salt is anhydrous.

Hydriodate of berberina prepared like the former, is nearly insoluble in alcohol, soluble in 2130 parts of water, crystallizes in small reddish yellow needles, and has the same composition.

The hydroferrocyanate is obtained by double decomposition; it is little soluble in water and alcohol, and crystallizes in greenish-brown microscopic needles; dried below 120° C. (248° F.) its formula is $2(C_{42}H_{19}NO_{10}, HCy) + FeCy$. The hydroferriocyanate resembles this salt, but possesses, after drying, an apple green color; composition = $3(C_{42}H_{19}NO_{10}, HCy) + Fe_2Cy_3$.

The double chloride of gold is precipitated from diluted solutions with constant agitation. It is a brown amorphous powder, somewhat soluble in boiling concentrated muriatic acid, and in a mixture of this acid and alcohol, from which solution it separates in floccules consisting of microscopic needles; light decomposes it slowly; the dry salt is $C_{42}H_{19}NO_{10}, HCl + AuCl_3$.

The picrate crystallizes from boiling alcohol, in which it is

salts with metallic chlorides ; the platinum double salt has the composition $C_{42}H_{19}NO_{10}$, $HCl + PtCl_2$.—(*Bull. de l'Acad. Roy. Belg.—Annal. d. Ch. u. Ph.* xxxix. 132—140.)

DESCRIPTION OF THE HIMALAYAN MUSK DEER, ITS HAUNTS, AND THE METHOD OF TAKING THE MUSK ;

Accompanying a stuffed specimen of the animal presented to the Museum of the Pharmaceutical Society by Messrs. Peake, Allen & Co.

By M. F. PEAKE.

The specimen before the meeting probably will serve to clear up many points relative to the quality and appearance of musk, and to explain the difference, and cause of there being so many varieties and qualities in the market.

The deer, as you perceive, is about the size of a greyhound, and, from the length of its tusks, it is no doubt five or six years of age, or perhaps more. Its brown stubby coat more resembles small porcupine quills than hair, and every part of the animal has a strong odor of musk. The head, legs, feet, and general outline, are those of the common deer ; but in its habits it more resembles the hare, selecting a solitary place or form separate from its species. It is sometimes found in the lower ranges of the mountains, at an elevation of 7,000 to 8,000 feet. It is an inhabitant of the forest, but partial to woody ravines, and is common only on the spurs or projecting points jutting from the eternal snowy ranges, at an altitude of from 10,000 to 14,000 feet.

The natives take the musk deer by snaring, but this specimen was, it is believed, shot by the rifle. On being approached, they bound off with great rapidity, and when at about eighty to one hundred yards, turn round for a few seconds to gaze on their disturber with their faces towards him ; at this instant the unerring aim is taken, but the prize is not always secured, as sometimes it falls down precipices where it cannot be reached. Days and days are frequently lost without falling in with any, and, on an average, upwards of thirty miles are traversed daily.

The toil of getting up and down these immense mountains is very great, and the pursuit is attended with many hardships and privations. The time expended and distance traversed render the occupation very expensive, from the necessity of being ac-

accompanied by various grades of servants, some to hunt up and look out for game, others to carry provisions, cooking utensils, &c.; consequently, genuine musk must always maintain a high rate.

It will be seen that there is a thin membrane under the outer skin of the abdomen, of a small bladder-like appearance, containing a thickish soft substance, which is the musk. The musk in each membranous pod usually weighs from two drachms to an ounce; from an old deer, from one ounce and a half to two ounces; and its odor increases in proportion to the age of the animal. The male only furnishes the musk; at the age of twelve months and under it does not yield any, and it is only at three years that the pod contains sufficient to be worth the trouble of extracting. The practised eye can generally judge if it be a young one—if so, it is allowed to escape. At two years the pod contains a yellowish milky substance, and, when first changed to musk, it yields not more than two drachms, frequently less.

A few extracts from our Himalayan correspondent's letters may more clearly illustrate its character:—

“One or two small parcels I have sent to London have had a preference in the market even to the best Assam. About sending it in pods with the hair on? I will do so if you like, but I would not recommend it, as my musk is genuine just as it is taken from the animal. The thin bladder-like skin dries in the sun in a few hours—that in the hairy pods, on the contrary, gets quite roasted in the process of preserving and preparing.

“The native plan is to make a stone nearly red hot, and the pod is first applied to it inwardly and outwardly till the skin is nearly dry, when it is stitched up, and the navel side is then held to the stone, pressing it and closing it with considerable force till the pod is quite dry. If this was not done, putrefaction would ensue, which, though only of the skin, would not improve the musk.

“I sent both kinds home, to ascertain which was best, and that in the pods without the hairy skin was declared to be far superior. All came from the same place, and from animals killed the same season.”

In a letter of a former year he states:—

“I send you an account of the season's produce—viz. 120 pods, which weigh about 110 to 120 ounces or more, as they are large. The small ones being nearly all skin, I thought it advisable to let the natives have them to dress in their way and to sell to natives.”

The musk pod familiar to us all is this membranous bladder, cut from the deer with a portion of the outer skin; it is pressed and stitched up, and dried on a hot stone. By this continued heat much of its odor is driven off, and it is consequently deprived of its qualities as a remedial agent, and for the use of the perfumer greatly deteriorated. A large quantity of musk collected by natives, which is invariably falsified, finds its way to this and other countries. They cut the young pods, containing no musk at all, as before mentioned, and fill them with the liver and blood of the animal, mixed with this yellow fluid and a small portion of genuine musk, fill, and sew them up in the skin, and dry on the hot stone; or those which yield half a drachm to a drachm they mix and dry in like manner.

At one of the Government sales in India of presents given by native princes, there were many pods of musk, to appearance very fine, which proved to be nearly worthless; they had evidently been “made up,” and from long keeping the little real musk they contained had considerably evaporated.

It would be a difficult matter for a native to resist the temptation of not making some addition even to the finest pods, or of extracting a portion and filling it up with the mixture of blood and liver.

The interior of the Himalayas where the supply is obtained is towards Ladâk, Thibet, and Chinese Tartary, and, as these mountains extend over so many thousand miles, it is probable that the musks known as China, Nepaul, and other musks, and perhaps some Russian, are from the same districts. The Tartar tribes wander from place to place, bartering with the natives of these several countries who have access to these regions. Hence the musk would be from the same species, the difference in appearance being caused by its varying age and mode of preparing and drying.

The genuineness of musk depends on the honesty of the na-

tives and others who procure and dispose of it to the various markets.

The musk in the membranous bladder yields nearly double the quantity of grain musk to an equal weight of musk with the skin and hair.—*London Pharm. Journ.*, Feb., 1861.

NOTE ON THE USE OF BALSAM OF PERU IN THE ROMAN CATHOLIC CHURCH.

BY DANIEL HANBURY, F. L. S.

In an interesting notice respecting the liquid commonly, though incorrectly, called *Balsam of Peru*, given some months ago in the *American Journal of Pharmacy*, the writer, Dr. Charles Dorat, pointed out the curious fact that the balsam was at one time in such great esteem, that its employment was sanctioned by high ecclesiastical authority in the preparation of the chrism used in the Roman Catholic Church. It appears, moreover, that there still exist among the archives of Guatemala, copies of bulls of Popes Pius IV. and V., authorizing the clergy to make use of this balsam in the Holy Chrism, and pronouncing it sacrilege to destroy or injure the trees producing it.

Thinking it would be interesting to ascertain with precision the terms of these ancient documents, I asked my friend, Signor Vincenzo Sanguinetti, Professor of Mineralogy at Rome, to make application in the proper quarter, and to obtain for me, if possible, copies of the bulls in question. Professor Sanguinetti was kind enough promptly to respond to my request, but he found that the records of bulls issued during the pontificate of Pius IV. have been lost, and that none can now be discovered in the archives of the Vatican. His search for the bull of Pius V. was, however, successful, and he forwarded me a copy, which, with a translation, I have given below. It will be observed that the bull allows the substitution of *Balsam of Peru* for *Mecca Balsam*, which latter, mixed with oil, constitutes the ordinary *Chrisma principale* of the Roman Catholic Church.*

* Vide Dr. Hook's *Church Dictionary*, Ed. 6, Lond., 1852, where *Chrism* is thus defined :

“ *Chrism*—Oil consecrated in the Romish and Greek churches by the

Translation.

A Faculty granted to the Bishops of the Indies, for the preparation of the Holy Chrism with a certain liquor or juice in the place of Balsam.

Pius V., Pope, for the perpetual commemoration of this matter.

We are rendered most anxious to admit to the favor of a careful hearing, these prayers, worthy of attention, by which a necessity occurs in the preparation of sacred things, and how the same may be provided for.

1. Forasmuch as it hath lately been explained to us, that in those parts of the Indies where our prelates sojourn, there is not found, nor can be found, the Balsam trees or oil therefrom, necessary for the preparation of the Holy Chrism; but there is found a certain liquid or juice, of wonderfully fragrant odor and exceedingly efficacious for the cleansing of wounds, which liquid is commonly used instead of the true Balsam, for it produces all the effects which the Balsam brought from Alexandria is accounted to have produced.

2. Wherefore these same prelates of the parts of the Indies have caused us to be humbly supplicated, that under these premises we would, of our apostolic bounty, vouchsafe to provide some convenient remedy.

3. We, therefore, willing to provide against necessities of this kind, and moved by these prayers, do, of our apostolic authority, concede by the tenor of these presents, full license and permission, as well to the archbishops as to the bishops of those parts, and, for the time being, to those prelates who may in future sojourn in those parts, that they may, in the preparation of the Holy Chrism freely and lawfully use the said liquid or juice in the place of balsam. And by a further indulgence we decree

bishop, and use in baptism, confirmation, orders, and extreme unction. This chrism is consecrated with great ceremony upon Holy Thursday. There are two sorts of it; the one is a composition of oil and balsam, made use of in baptism, confirmation, and orders; the other is only plain oil consecrated by the bishop, and used for catechumens and extreme unction. Chrism has been discontinued in the Church of England since the Reformation."

Consult also Hoffmann, *Lexicon Universale*, Lugd. Bat., 1698 (in verbum)

that the same efficacy shall be attributed to the said Holy Chrism if prepared aright with the said juice, as if balsam were an ingredient in it.

4. Any previous constitutions or ordinances whatever, whether apostolic, or given forth by provincial and synodal councils, whether special or general, to the contrary notwithstanding.

Given at Rome, at St. Peter's, under the Fisherman's Ring, this 2d day of August, 1571, in the 6th year of our Pontificate.
—*London Pharm. Journ. March, 1861.*

THE POLYSULPHIDES OF THE HEAVY METALS.

By HUGO SCHIFF.

Concerning the behaviour of the metallic salts to the alkaline polysulphides, the chemical literature contains but two statements, both by Berzelius, namely, the behaviour of lead and of copper salts to pentasulphide of potassium. The following are the results of experiments performed by the author; in all cases a dilute solution of the salt was poured into an excess of a diluted solution of commercial liver of sulphur or of yellow sulphide of ammonium. The precipitates are mostly thick and flocculent, and soon begin to decompose, by separating sulphur and rendering the clear liquid opalescent; the precipitate usually becomes darker.

Lead-salts yield a deep red precipitate; the oxide and carbonate assume, on agitation, the same color; the precipitate turns brownish and finally black.

Copper-salts yield, according to the concentration, a dirty yellow to light brown precipitate, which separates sulphur without changing the color materially, or becoming of a constant composition.

Silver-salts: light yellow, turning green, finally black.

Salts of the binoxide of mercury light yellow; of the protoxide, dirty yellow, both immediately becoming black.

Salts of nickel, cobalt and protoxide of iron: black.

Sesqui-salts of iron at first violet, instantly yellow, subsequently discolored, if the sulphide is added to the salt. On dropping sesquichloride of iron into the sulphide, a yellow pre-

precipitate appears, changing through green into blue, finally black; the blue color lasts $\frac{1}{2}$ to 1 hour.

Salts of chromic oxide: a yellow precipitate, separating sulphur and evolving sulphuretted hydrogen; the precipitate then contains chromic oxide, but no sulphide.

Salts of protoxide of manganese: a yellow precipitate, gradually increasing in bulk, turning lighter and changing into the ordinary sulphide.

Bichloride of tin: yellow, liberating sulphur, but not altering the color.

Protochloride of tin: liver-brown, slowly becoming lighter.

Chloride of gold and of platinum: yellow, soon discolored, dissolving in boiling liver of sulphur, and reprecipitated yellow by acids.

Basic nitrate of bismuth: dark yellow, gradually brownish black.

Salts of antimony: bright yellow, soluble in excess, reprecipitated as the orange colored pentasulphide by acids; the original precipitate gradually changes into this with separation of sulphur.

Neutral compounds of arsenious and arsenic acid: yellow, containing free sulphur, soluble in slight excess.

Zinc-salts: white or very pale yellowish; after drying, straw-yellow, without separating sulphur; composition of the anhydrous = Zn S_5 .

Cadmium-salts: light yellow, not decomposed, consisting of Cd S_5 . The color of the dry precipitate is nearly the same as the protosulphide; the moist precipitates are different.—*Ann. d. Chem. u. Ph.*, xxxix., 68—75. J. M. M.

CITRATE OF IRON AND QUINIA.

BY WILLIAM S. THOMPSON.

Read before the Maryland College of Pharmacy, Feb. 14th, 1861.

This preparation, though not officinal in the U. S. Pharmacopœia of 1850, has acquired considerable favor among physicians as a remedy in which the properties of both iron and quinia are

combined, without possessing the ferruginous taste of many other preparations of iron. Several formulas for its preparation have been published, none of which seem to have accomplished the desirable result of affording a preparation easy of solution.

An investigation of this preparation having been one of the questions proposed by the committee for the selection of subjects for examination, some time since, it was accepted by me; and I now offer the accompanying formula, as the result of a number of experiments; performed at intervals of leisure.

I first prepare a solution of persulphate of iron of definite strength, according to the process recommended by Wittstein; or that of the U. S. P. for preparing the hydrated sesquioxide; the strength of the solution to be ascertained by assaying a portion; but to save this trouble, I prepare a solution, each fluid ounce of which will yield sixty grains of anhydrous sesquioxide, by the following formula:

Solution of Persulphate of Iron..

Take of Protosulphate of iron, in crystals, 16 ounces, troy.

Sulphuric acid, commercial, . 3 “ “

Nitric acid, commercial, . 4 “ “

Water, a sufficient quantity.

Place the protosulphate of iron in an open dish of the capacity of at least eight pints and add 24 fluid ounces of water and the sulphuric acid. Place the dish upon a sand-bath, over a furnace or other convenient source of heat, and after the protosulphate is dissolved and the solution has attained the boiling point, or nearly so, add the nitric acid in small portions from time to time, allowing a sufficient interval of time to elapse between each addition of acid to avoid violent effervescence. These directions are essentially the same as the U. S. P., but it is better to complete the process by the following directions of Wittstein: “A drop is taken out on the end of a glass rod and mixed with a drop of solution of ferridcyanide of potassium; if this causes only a brown coloration, the oxidation of the iron is perfect, but if there be a trace of blue, more nitric acid is necessary.” The solution is now reduced by the addition of water to the measure of $36\frac{3}{4}$ fluid ounces, which is a little less than the

quantity afforded by calculation, and allows for any trifling loss.

The solution should be kept in a covered bottle, or the bottle should be kept secluded from the light, as this imponderable agent seems, like organic matter, to possess the power of reducing the persalts of iron, and thus the solution may become contaminated with protosulphate.

A solution of persulphate of iron of known strength is very useful to the Pharmaceutist as a source of peroxide in making a number of preparations, and is also convenient for the hasty preparation of this re-agent when wanted as an antidote for arsenious acid.

The next step in the process is to prepare a solution of ammonio-citrate of iron, containing an excess of citric acid, which is done as follows :

Ammonio-Citrate of Iron.

Take of Solution of persulphate of iron, 35 fluid ounces.

Water of ammonia, sp. gr. 0.925 a sufficient quantity.

Citric acid, $14\frac{1}{4}$ ounces, troy.

Water, a sufficient quantity.

Dilute the solution of persulphate of iron with the water in a glass jar or bottle of proper size, pour in fifteen fluid ounces of the water of ammonia, and stir the mixture until the re-action has taken place; allow it to settle, and if on testing the clear solution it is found to contain no iron, wash the precipitate in the usual manner, until the washings are tasteless. Should the supernatant liquid contain iron, more ammonia is necessary, before proceeding with the washing. The precipitate is now to be transferred to a muslin filter and allowed to drain until it assumes the form of a magma, when it should be placed in a dish with the citric acid, and the mixture heated by means of a water-bath until the peroxide is perfectly dissolved; then add six fluid ounces of the water of ammonia, remove the dish from the water-bath and allow the solution to cool.

Having now obtained a clear solution of ammonio-percitrate of iron, containing an excess of citric acid, the next step is to introduce the quinia, for which purpose carbonate of quinia is prepared as follows :

Carbonate of Quinia.

Take of Sulphate of quinia, $3\frac{1}{2}$ ounces, troy.

Carbonate of soda, a sufficient quantity.

Water, a sufficient quantity.

Diluted sulphuric acid, $4\frac{1}{2}$ fluid ounces.

Dissolve the sulphate of quinia in five pints of water, with the aid of the diluted sulphuric acid. Dissolve twenty ounces of carbonate of soda in five pints of water and add as much of the solution to the solution of sulphate of quinia, as may be necessary to precipitate the whole of the quinia; a considerable excess of carbonate of soda is not objectionable. Transfer the precipitated carbonate of quinia to a muslin filter and allow it to drain so as to free it as much as possible from sulphate and the excess of carbonate of soda; the remainder may be removed by displacement with a small quantity of water, so as to avoid any loss of the carbonate of quinia, which seems to be slightly soluble after it is freed from sulphate and carbonate of soda.

Ammonio-Citrate of Iron and Quinia.

Upon adding the washed magma of carbonate of quinia to the previously prepared and cooled solution of ammonio per-citrate of iron, it dissolves readily, with effervescence. The solution should now be filtered and evaporated in a water-bath to about the consistence of thin syrup, and spread thinly and evenly on plates of glass to dry. The concluding part of the process requires some management to produce an elegant result: it should be performed in a warm and dry atmosphere at a temperature of from 70° to 80° F. If the salt is allowed to dry on the plate of glass at the temperature of the room until the whole surface has separated into small fissures, and then suspended over a furnace or stove, at some distance above it,—say at the temperature of 90° F.,—it immediately loosens from the plate in the form of brilliant scales, and may be removed without difficulty with a palet knife or a plane iron.

Ammonio-citrate of iron and quinia cannot be regarded as a chemical compound of definite proportions, but merely as a mixture of the citrates of iron, quinia and ammonia: its component parts may be stated as follows, in 100 parts:

Peroxide of iron, anhydrous,	20.48
Citric acid, anhydrous,	53.81
Ammonia,	5.17
Quinia,	12.17
Water,	8.37

100.00

It may be proper to remark here, that water of ammonia of the sp. gr. 0.925 is about the strength of the Aqua Ammonia F. F. F. of the manufacturers, and contains 19.54 per cent. of ammonia. If weaker water of ammonia is used, of course it will require an increased quantity to furnish the same amount of ammonia as that of the sp. gr. 0.925, which may be determined by an easy calculation.

I have heard objection made to the introduction of ammonia into this preparation, but upon what reasonable ground I am at a loss to conceive: a small quantity of citrate of ammonia can certainly do no harm, and if it serves to render the compound soluble, this would certainly seem to be a desideratum.

The substitution of potassa for ammonia will also produce a soluble preparation, and soda would no doubt have the same effect; but the latter I have not tried: the potassio-citrate of iron and quinia is in very brilliant scales of light brown color and very soluble.

The proportion of citrate of quinia in this preparation is equal to about one-sixth part or one grain in six grains of the salt. The reasons for adopting this proportion, are, first,—it has been the custom in this country so to prepare it; secondly, Physicians are accustomed so to prescribe it; and thirdly, it is probable that a formula will be adopted in the forthcoming Pharmacopœia containing the same proportion.

Ammonio-citrate of iron and quinia is very soluble, of a beautiful olive green color, decidedly bitter, possesses but little or no chalybeate taste and has an acid reaction.—*Journ. and Trans. of the Maryland College of Pharmacy.*

ON THE PREPARATION OF STARCH FROM CASSAVA,

BY JOSIAS CORK.

The growth of cassava in quantity has had my best, my most earnest consideration. If it cannot, in every sense of the word, compete with other staples, now, or which may be grown, my praise of the root must receive qualification.

First, then, cassava is alike at home in the mountains, and in the lowlands ; it grows readily everywhere. The least moisture in the soil is sufficient to induce vegetation at the time of planting, and, once growing, no drought destroys, it simply for the time retards the crop.

But, if general experience does not fully corroborate this positive statement,—and there are lands of so dry a nature that a long drought does kill the cassava plant, and I will not say there may not be such lands anywhere, as I can only decisively speak of what I have noted in my own experience,—still this evil, if it anywhere exists, is less in the cassava than in any other crop I know.

For, secondly, the propagation, and, therefore, also, the supply of a field partially injured by a drought, is about the easiest thing a planter has to do. To grow corn, pulse, yams, and many other things, a portion of valuable produce must be used for seed. Not so the cassava. All that is needed is, to take a cassava stick, and mark off a length containing three or four “eyes;” pass a knife round and cut just below the skin, and then use a slight breaking power with both hands. Each bit is now a future plant ; the eye or two below the soil serve for future roots ; the eye or eyes above put forth leaves and stalks. It must be evident, then, that a bundle of cassava sticks, which any one can carry under his arm, will suffice for a considerable breadth of prepared ground, and the time and labor to cut up and plant is almost the least possible to be conceived for such operations, and the cost is positively nothing. Anybody, anywhere, who has cassava growing, can give readily a few cassava sticks to any body and everybody, and yet have enough left for himself, and to spare.

Thirdly.—Another fine feature is this :—It is not an exhausting crop. Like other productions grown for a substance which

appears to derive its constituents from the atmosphere, or composed, like sugar, of carbon, hydrogen, and oxygen, you may grow and re-grow, with change, of course, or some rest, or a slight manuring, on the same lands, *ad infinitum*. In fact, everybody feels that land is always fit for cassava, however unfit it may have become for other productions.

Fourthly.—This is a very accommodating crop. The roots ripen and are fit to be manufactured, or remain and grow, and again ripen, and again remain and grow. Although there is not a positive certainty as to the exact time, for the changes from rain to dry weather are uncertain, still there is a choice of a whole year or more for the grower. If the roots be not dug when they become dry and mealy, they soon acquire what is termed a “fresh spring,”—that is, the roots become somewhat watery, and enlarge, and then ripen. This goes on from the age of about ten months to more than two years. I do not know from experience beyond twenty-four months, but it is evident to me that it is not the limit, or anything like it. All the while the roots have been enlarging, so that there has been, as far as I can judge, no loss from delay. I have known a field of cassava cut down to near the roots in a most ruthless way by a lazy fellow who desired a field of corn and would not prepare fresh land. I have seen the crop of corn, and the crop of cassava again, covering by vigorous stems and leaves the ground, and, after a while, the ripe crop of cassava. Of course, this system is the *acme* of laziness, and to be wholly condemned, but, nevertheless, the fact stands forth, as a proof of the extreme hardihood and wonderfully-accommodating nature of the cassava crop.

Fifthly.—Quantity, as I have proved, or sought to prove, is, as other root crops, very large. I need not, therefore, enlarge on this head, but pass on to manufacture.

There again the cassava says, “Try me—try me: you will find me, in parts, and in whole, a crop worth your best care and attention.” On this head I observe,—

First.—Each root has to be washed, and the cuticle must be taken off. The plain surface of the root makes the washing easy; the soft nature of the substance renders the skinning process as easy as easy can be. The comparison in favor of cassava, as against arrowroot, is in both cases fully as three to one in favor of cassava.

Secondly.—The grating is also in favor of cassava, as compared to arrowroot, in almost an equal rate. But,

Thirdly.—I would not grate at all ; but quote from pages of a known scientific work, and I suppose the site of operations to be the old works of a thrown up sugar estate, and unfortunately many such a spot can too readily be found. The manufacture is arrowroot, but of course the same works would equally do for cassava, and I may just observe that the manufacture is in the Island of St. Vincent, and I have no doubt its completeness is the cause of the superior price obtained for the St. Vincent arrowroot, which is just threefold the price of Jamaica arrowroot, in the English market :

“The skinned roots are thrown into a large cistern, with a perforated bottom, and then exposed to the action of a copious cascade of water. The cleansed roots are next put into the hopper of the mill, and are subjected to the powerful pressure of two pairs of polished rollers of hard brass, the lower pair of rollers being set much closer than the upper. The starchy matter is thus ground into a pulp which falls into the receiver placed beneath, and is thence transferred to large and fixed copper cylinders, tinned inside, and perforated at the bottom with numerous minute orifices, like a kitchen drainer. Within these cylinders, wooden paddles are made to revolve with great velocity, by the power of a waterwheel, at the same time that a stream of pure water is admitted from above. The paddle arms beat out the fecula from the fibres and parenchyma of the pulp, and discharge it in the form of a milk through the perforated bottom of the cylinder. This starchy matter runs along pipes, and then through strainers into large reservoirs, where after fecula has subsided, the supernatant water is drawn off. The drying-house on the Hopewell estate is constructed like the hot-house of an English garden, but instead of plants it contains four dozen of drying-pans made of copper, seven and a half feet by four and a-half, and tinned inside. Each pan is supported on a carriage, and they run on rails; immediately after sunrise these carriages, with their pans covered with white gauze to exclude dust and insects, are run out into the open air, but if rain be apprehended they are run back under the glazed roof. In about four days the fecula is thoroughly dry and ready to be packed.”

What is done in St. Vincent may be done in Jamaica. The trash-houses of the past could easily be converted into drying houses for the future on any old sugar estate having a supply of water. The water which might easily be made to turn a cassava mill with two pairs of rollers, the boiling, curing, and still houses might all be transformed and brought into use for cassava; and with the ingenious contrivance of our Island architect, Mr. Leahy, of having blades of glass, the drying-house might be thoroughly ventilated. I would not only have a glass roof, but for the most part glass walls, thorough ventilation, and thus lessen the time to the minimum for thorough drying.

The cost, then, of transformation would be very moderate indeed. The metal of the sugar boilers and still would pay, or nearly pay, for the vessels required for the cassava.

There is no duty on glass manufacture, and large slabs of thick glass cost little in England. The cost of manufacture of starch and blocking the fibre, would certainly be less than the cost of sugar manufacture.

To any one, then, who will turn his attention to cassava, he would certainly have a prospect before him of making an old sugar estate a handsomely paying concern as a cassava plantation.—*Chem. News, London, from Jamaica Guardian.*

PROXIMATE ANALYSIS OF PLANTS, ETC.

(Continued from page 184.)

FURTHER INVESTIGATION OF THE SEVEN DIFFERENT SOLUTIONS, AND THE DISTILLATE OBTAINED FROM THE AQUEOUS DECOCTION.

SECTION I.—*Examination of the aqueous decoction and the distillate therewith obtained.*

A.—Examination of the distillate.

The watery distillate, which is obtained by the decoction of the material with water according to the previous directions, is either a clear or a turbid fluid. It has either a film of oil floating on the surface, or precipitated at the bottom, or not. If the distillate is a clear fluid, it contains either only a very little quantity of substances sparingly soluble in water, or none of these substances. If the water is turbid from the separated oil globules or, solid particles, it contains little of substances difficultly soluble in water or much of readily soluble ones. The water at first, when a layer of oil has collected at the top or bottom, mechanically separated from the oil.

After the principal bulk of the water has been removed by a syphon, its complete removal is effected by means of a separatory funnel or a pipette. The water is then treated precisely as when no layer has been separated on the surface or at the bottom. This method of treatment is described at length further on.

a.—Examination of the separated oil.

It is first ascertained whether the separated oil reacts on litmus paper or not. If the blue litmus paper is reddened thereby, the oil is either a volatile acid or a mixture of several volatile acids, or lastly a mixture of one or several volatile acids with other volatile bodies. It is scarcely necessary to remark that, besides the peculiar volatile acids, some aldehydes also may be present; for example, salicylous acid as well as the acid ethers of bibasic acids—as, for instance, the acid salicylate of methyloxyde, which is obtained by the distillation of *Gaultheria procumbens*, and which behave in this and other respects as volatile acids.

If the oil has an acid reaction, the oil is introduced into a flask, and baryta water added thereto with agitation. This addition is continued until it has no longer an acid reaction; afterwards it is allowed to precipitate quietly. Either the oil has quite disappeared by this treatment with baryta water—if so it was a volatile acid, or a mixture of several such acids, or an acid aldehyde resembling the salicylous acid, or an acid ether, possibly a mixture of several aldehydes or ethers, or a mixture of several members of these two classes of bodies, or of all three.

The oil which remains, after the treatment with baryta water, is neutral or alkaline. In the latter case it is treated with dilute sulphuric acid. When a volatile base is present therein, it dissolves in the dilute sulphuric acid. If absent, as much oil is dissolved as would be dissolved in an equal quantity of pure water. If the first separated oil has exhibited an alkaline reaction instead of an acid one, it is at once treated with dilute sulphuric acid. Either a complete solution of the oil takes place, in this case an organic volatile base, or a mixture of several such bases is present, or a partial solution is effected when it is a mixture of one or more volatile bases with non-basic bodies.

As we learn by these experiments whether bases or acids are at the same time present, or bodies which behave as acids towards bases, and in case such bodies were found they have been removed by the treatment with sulphuric acid and baryta water, we now proceed to detect the presence of the aldehydes. If neither an acid nor a base is present, the oil can at once be used for testing for aldehydes. With this object, a portion of the oil is mixed with a solution of the bisulphite of potash as concentrated as possible. When an aldehyde is present, it is generally taken up by the solution of bisulphite of potash. Either a portion of the oil, or the whole of it, is dissolved, depending on the presence of indifferent bodies, besides one or more aldehydes. It should be observed, by the solution,

when it takes place, whether a more or less elevation of temperature results, caused by heat becoming free, in consequence of the combination of the aldehyde or aldehydes with the bisulphite of potash. When no reaction is produced at ordinary temperatures, this may be promoted by heat. Sometimes after the solution of the oil, or a portion of it, in the concentrated aqueous solution of the bisulphite of potash, by long standing and cooling, a separation of crystals results. If no such separation is observed, the undissolved portion of the oil can be removed mechanically, and alcohol carefully added to the solution, by which the separation of the aldehydes, or aldehyde in combination with the bisulphite of potash, is facilitated. Sometimes the addition of bisulphite of potash quite or partly congeals the oil, in consequence of the formation of a compound of the aldehyde with bisulphite of potash. In this case the solid or semi-solid mass should be washed with alcohol, and the washed product pressed between bibulous paper. • If neither before nor after the addition of alcohol a solid compound of one or more aldehydes with bisulphite of potash results, the action of the corresponding soda-salt is tried, and when this affords no solid product, the corresponding ammoniacal bisulphite should be employed. If an aldehyde, or several of them together, are present, we obtain with the bisulphites of potash, soda, or ammonia, a compound or a mixture of them, from which, by the addition of dilute sulphuric or hydrochloric acid, or a solution of caustic potash or soda, the aldehyde or aldehydes can be again separated.

In the same way here described, the oil, freed from acids by baryta water, and from bases by dilute sulphuric acid, is treated to remove the aldehyde or aldehydes present. * If, after the separation of the bases and acids or aldehydes present, any oil remains, this portion may either be a hydrocarbon or a mixture of several such bodies, or an oxygenated indifferent oil, or a neutral compound ether, or a mixture of several of these bodies.

To ascertain whether we have to do with a *hydrocarbon* or a *mixture of several hydrocarbons*, or whether an *oxygenated volatile substance* is also present, a fragment of sodium or potassium is introduced into the oil, previously dried by means of chloride of calcium. If the metallic fragment remains unacted upon in the fluid even after the application of a gentle heat, no oxygenated body exists in the oil; consequently the oil must be

* I found, by the examination of oil of *origanum*, that it consisted of two volatile oils, which afforded, when heated with an aqueous solution of bisulphite of soda or ammonia, a solid body, but which contained no sulphur, soda, or ammonia. I have deemed it necessary to call attention to this circumstance, as it is highly probable that there are many other volatile oils which behave like oil of *origanum*. Consequently, if we would decide with certainty on the presence of an aldehyde, we must ascertain whether the product obtained by the action all alkaline bisulphites contains sulphurous acid, or the alkali employed in its preparation. If sulphurous acid and a'kali cannot be detected, no aldehyde is present.

a hydrocarbon, or a mixture of several hydrocarbons. On the contrary, if that oil reacts on the potassium or sodium, an oxygenated body, or a mixture of several such bodies, is present.

To prove whether or not the oxygenated body present is a *compound ether*, the oil under examination is divided into two parts. One portion is treated with caustic ammonia in a small flask, by which, in many cases, an amide of the acid of the ether separates, while the alcohol corresponding to the ether becomes free. The second portion of the oil is introduced with baryta water into a small retort, a little of the crystals of hydrate of baryta thrown in, and the retort so connected with a small Liebig's refrigeratory apparatus that the condensed vapors are compelled to flow back again into the retort, when the contents of the retort are heated to the boiling point. When the ebullition has been continued for some time, the refrigeratory apparatus is brought into its ordinary position, and the distillation proceeded with. The hydrocarbons present, as well as the indifferent oxygenated oils, pass over with the aqueous vapor; likewise the alcohols derived from the ethers. The acids of the ethers remain behind, combined with the baryta. The residue of the retort is, when cold, removed, and the baryta separated from the liquid, which, when necessary, should previously be filtered, by means of dilute sulphuric acid. After separating the sulphate of baryta by a filter, the liquid is again distilled, whereby the acid contained either in the distillate in which its presence may be easily detected, or when it is not distillable with water, its concentrated solution remains behind in the retort. From this fluid the acid, under proper conditions, may be crystallized out. The existence of compound ethers in the oil, separated from the distillate, is not very frequent, as the majority of ethers, being readily soluble in water, are found dissolved in the aqueous distillate.

If no compound ether is present, it is still to be determined whether an *oxygenated indifferent volatile oil* is admixed with hydrocarbons or not, which was partly discoverable from the treatment of the oil with potassium or sodium. To detect such body, the oil to be examined is introduced into a small retort, which is half filled with coarsely powdered soda-lime.* The oil is absorbed by the soda-lime. After a flask, as a receiver, has been adjusted, the retort is carefully heated. The hydrocarbons will be distilled over, unchanged in their composition, while the oxygenated oils will be decomposed by the action of the alkaline compound. Generally, non-volatile compounds result therefrom, which only are decomposed by higher temperatures, under the formation of volatile compounds. Gerhardt and Cahours, in this way, have separated the hydrocarbons from

* Soda-lime is made by mixing lime with a solution of caustic soda, in such proportion that, upon evaporation, the mixture, when heated to redness, shall be equivalent to one part of the hydrate of soda, with two parts of anhydrous lime.—EDITOR PHARM. JOUR.

the oxygenated oils, in many mixed oils. Frequently the oxygenated oils afford, by this treatment, colored decomposition products. Thus the distillate of the oil of calamus over soda-lime is at first colorless, so long as the lighter volatile oils distil over unaltered. Later, a blue distillate appears, arising from the decomposition of the less volatile oxygenated portion of the oil of calamus, by the alkali at a higher temperature.

We turn back to the aqueous solution of the baryta salt or salts, which was obtained by agitating the oil with baryta water, which oil had collected on the surface, or at the bottom of the watery distillate. The solution is divided into two parts. The first is introduced into a retort, into which a little hydrate of baryta is placed. The retort is connected with a refrigerator, and the greater part of the water is distilled off. If an acid ether was present, this is decomposed. The corresponding alcohol is separated, and is found in the distillate, and the acid in combination with the baryta is in the residue of the distillation. The second part of the solution is mixed with dilute sulphuric acid, as long as a precipitate of sulphate of baryta is formed. The sulphate of baryta is separated by filtration, and the filtrate distilled off until a small residue remains. As the fluid must contain a tolerably large quantity of volatile acid compounds, it may be ascertained whether an aldehyde of an acid character is present or not, by the addition of a highly concentrated solution of alkaline bisulphites, and a sufficiently large quantity of anhydrous alcohol. If this is not the case, then only a volatile acid, or a mixture of several such acids, is present.

It was previously mentioned that the oil separated from the distillate, when before or after treatment with baryta it reacted alkaline, should be shaken with dilute sulphuric acid that the base or bases present may be obtained dissolved as sulphates. The solution of sulphates is then mixed with baryta water as long as a precipitate of sulphate of baryta ensues; for certainty, one or two drops of baryta water is added in excess, and the liquid distilled from a retort which is connected with a refrigeratory apparatus, as long as the distillate has an alkaline reaction. The distillate is now exactly neutralized with dilute sulphuric acid and evaporated to dryness. The residue is treated with alcohol, which dissolves the sulphates of the bases. If a residue remains, either ammonia or methylamine is present, or a mixture of both, in the form of sulphates. After the expulsion of the alcohol from the alcoholic extract in the water-bath, the salts of the other bases perchance present remain behind. They may be easily obtained therefrom, by distillation with a solution of caustic potash, in an isolated form, or by mixing the salts with a solution of caustic potash and agitating with ether, by which an ethereal solution of the bases is obtained, from which the ether can be distilled off. If by the examination of the separated oil no bases, acids, or aldehydes have been found; if no compound ethers are present, or if these bodies have been removed; further, if the oxygenated indifferent volatile oils sometimes present have been separated from the hydrocarbons by distillation over soda lime, in so far as

it is possible, by this method, we have still to ascertain *whether only a hydrocarbon, or a mixture of several hydrocarbons, is present.* To arrive at a conclusion on this point, the oil in question is distilled in a small retort in which a thermometer is inserted. A rapid continued rising of the boiling point proves that the oil is a mixture of several volatile substances.

It should be always observed whether a portion of the original oil, as it floats on the watery distillate, or falls to the bottom of the same as a layer, cannot be congealed by exposure to very low temperatures, independently of its reactions and other properties. Frequently a *partial separation, simply by exposure to cold*, may be effected in substances of that kind, more readily in this than in any other way.

In winter, the most convenient method is to stick a test tube containing the oil in a beaker glass filled with snow, and to stand the whole in a wooden vessel. The space between the glass and the wood vessel is filled with sawdust; the glass should stand on a layer of sawdust several inches high; into the glass, alcohol is poured carefully, when the snow melts, and the mixture cools down to 13° Fahr. below zero. The whole is covered with a quire of filtering paper. As paper and sawdust are bad conductors of heat, the depressed temperature continues sufficiently long to congeal the oil or to cause the separation of solid substances from it when this can be accomplished by cold.

Besides the volatile bodies just under consideration, which in the form of oils can be separated on the surface or at the bottom of the distillate, there exists still a class of bodies which in their composition are readily distinguished from those spoken of. These are the *essential oils containing sulphur*, as they are generally termed; for example, oil of mustard, oil of onion, oil of assafetida, oil of garlic, &c. The presence of these oils is generally rendered evident by their odor. But to be certain as regards their absence or presence, a portion of the oil is oxidized with nitric acid, and then tested for sulphuric acid. If sulphur is contained in the oil, it is converted into sulphuric acid by treatment with nitric acid, which can be detected by nitrate of baryta. The majority of these oils affords precipitates when dissolved in alcohol and mixed with a solution of bichloride of platina or bichloride of mercury. By the application of platina of bichloride the precipitates are either pure red, reddish-yellow, brownish yellow or reddish brown; and by the use of bichloride of mercury, on the contrary, white, sometimes with a shade of yellow.

It still remains to be stated *how the alcoholic solutions of ethereal oils* must be treated, as obtained when an oil is treated with alkaline bisulphites, and thereby partly congealed, and the fluid portion remaining removed from the solid compound by washing with alcohol.

Such a spirituous solution is shaken with milk of lime, and in a closed vessel allowed to remain undisturbed until the insoluble portion is deposited at the bottom. The clear fluid is taken off and distilled, to the distillate is added a piece of anhydrous, but not fused, chloride of calcium, after

it has been placed in a stopped bottle surrounded with cold water. The chloride of calcium dissolves in the alcohol and water present, and the volatile oil which *was* dissolved separates on the saline solution as a slight film, which can be removed by a pipette, washed with a little water, and obtained pure by rectification with water. As a strong bumping is unavoidable by boiling with a little water in the retort, I employ for this purpose a flask, and introduce with the water and the ethereal oil some large pieces of clean linen. This plan also prevents the spirting over in rapid distillation.

b.—Examination of the watery distillate.

If the watery distillate has a layer of oil on the surface or at the bottom which has been examined in the manner described, this distillate is a concentrated watery solution of the bodies contained in the layer of oil. The method of investigation, when the bodies are known, can be previously determined with exactness. As the bulk of these volatile substances which are readily soluble in water, must be contained in the distillate, a sufficient quantity of these bodies can be obtained from this watery solution when only a little was present in the separated oil. The *volatile acids*, in particular, which almost all are, tolerably soluble in water, can be obtained in large quantity from this fluid; likewise the *volatile bases*, when present. To obtain the volatile bases therefrom, the distillate is mixed with a few drops of sulphuric acid, and subjected to distillation. The bases remain as sulphates dissolved in the residue of the distillation. To separate the acids, they must be combined with a base, and the liquid removed by distillation. Although potash or soda, as the strongest bases, have the preference before all other bases, as by boiling they do not permit the volatile acids to become free, with which they have been once combined, their employment is still limited, when besides the volatile acids, other volatile substances exist in the distillate which by alkalies undergo a change in the heat if a small excess of such alkalies is present, or when they are rapidly decomposed by the oxygen of the air when in contact with alkalies. If soda or potash is employed, care must therefore be taken that no excess of alkali is present, but rather that a small quantity of free acid remains, which then clearly will not be retained, but be distilled off with the water and the other volatile bodies. The potash or soda can be replaced, often with advantage, by freely precipitated carbonate of copper, or the hydrated oxide of copper, by magnesia as well as by white lead, which has been specially prepared by passing carbonic acid through subacetate of lead, and should be applied in a fresh, moist condition, particularly when compound ethers are contained in the solution. When the distillate has deposited no layer of oil, but is clear or only slightly turbid, recourse must be had, as already mentioned, to *cobobation*. But as with cobobation a tedious heating of the fluid with the substance under examination is unavoidable, and the possibility of forming decomposition products is thereby

afforded, I prefer the direct concentration of a distillate, which contains little volatile ingredients, to cohobation. The concentration is accomplished in the following manner:—The distillate poor in volatile substances is mixed with so much dry common salt as it will dissolve, and the resulting fluid is subjected to distillation. Generally, after half the water has distilled off, only pure water passes over. The distillation is then interrupted, the distillate is again saturated with common salt, and re-distilled. By the repetition of the distillation as often as it appears requisite, a concentration can be effected which affords a highly concentrated solution of the substances under examination soluble in water, and accomplishes a separation of the greatest part of the substances difficultly soluble in water. If the concentration is not accompanied by the separation of oily bodies by this treatment with common salt, then only bodies are present which are very soluble in water. To obtain these, two methods are proposed; either the fluid is saturated with common salt and agitated with ether, which, when it separates, is removed, and may be evaporated, or the distillate is treated with chloride of calcium. When ethereal oils with high boiling points are present, the treatment with ether is to be preferred. The ether evaporates quickly when exposed in a dish to the air; and to prevent the evaporation of the volatile oil with it, care must be taken that the dish which contains the ethereal solution of the volatile oil is set in a place where a good current of air rapidly conducts away the ethereal vapor. On the contrary, when volatile oils with rather low boiling points are present, the treatment with chloride of calcium has the advantage. Into the fluid concentrated by distillation with common salt, chloride of calcium in fragments is thrown in until the fluid appears as thick as syrup; it is then subjected to distillation. The distillate is again treated with chloride of calcium, and re-distilled. By three or four repetitions of these operations either a separation of the dissolved substances ensues (sometimes only a partial one,) or the concentration has so far progressed that the substance can be freed from water by the addition of a large quantity of fused chloride of calcium, and distillation, and may be obtained as a distillate, which certainly will be the case when the body possesses a boiling point not much above 212° Fahr. It is clear that a concentration of this kind is quite as little necessary as cohobation, when only acid or basic bodies are contained in the distillate.

Before I conclude the examination of the distillate, or rather the volatile bodies present in it, I must here make some observations on the so-called fractional distillation.

Fractional distillation is recommended for the separation of mixed volatile substances. As this operation is generally performed, it is certainly suitable for the preparation in a pure state of the least volatile bodies in a mixture of that kind, but is not adapted for obtaining the more volatile constituents, because at the temperature by which the mixture boils, many of the constituents are evaporated which do not boil at that temperature.

The vapors of the boiling constituents do not pass over alone, but also the vapors of the less volatile substances are carried over with them. Instead of heating the mixture to the boiling point, it is more advantageous to heat it near to the boiling point. *A slow evaporation* then takes place, which proceeds, indeed, rather slowly, but by adopting suitable precautions, the lighter volatile constituents of a mixture are to be obtained approximately pure, if not absolutely free from all admixture of the other bodies. To guard against the oxidation of substances which so long exposed to the air at elevated temperatures, have opportunities enough to combine with the oxygen, the distillatory apparatus as well as the receiver should be filled with carbonic acid gas during the evaporation.

Minutes of the Philadelphia College of Pharmacy.

A special meeting of the College was held on the 5th of 3d month, 1861. Present 20 members. The President in the Chair.

In explanation of the object of the meeting an extract from the minutes of the Board of Trustees was read, showing that in view of the recent change in the administration of the Government at Washington, the Board have prepared a memorial to be addressed to the Secretary of the Treasury in relation to the appointment of Special Examiner of Drugs at this port, and had called this meeting of the College with a view to its adoption.

A communication was also read covering the memorial on the same subject, addressed to the President of the United States, by the several medical and pharmaceutical organizations of New York. On motion the memorial prepared by our Board of Trustees was then twice read and unanimously adopted as follows:

To the Hon. Salmon P. Chase, Secretary of the Treasury U. S.

The memorial of the Philadelphia College of Pharmacy, an institution chartered in 1822 by the State of Pennsylvania, for promoting a knowledge of the science and art of Pharmacy, and for directing attention to the quality of articles brought into the drug market, respectfully represents, that owing to the ruinous effect upon the public health of the importation of spurious, adulterated and deteriorated drugs and medicines, a law was passed by Congress, approved on the 26th of June, 1848, providing for the examination of all articles imported for use in medicine, during their transit through the various custom houses, with a view to ascertain their purity and genuineness, and directing that when unfit for use such goods should be destroyed or reshipped.

This law has had a salutary effect upon the quality of imported drugs and medicines, notwithstanding the obvious difficulties in the way of its proper and efficient execution. The professional requirements of the office of Special Examiner under this law are peculiar, and can only be determined upon by those who are themselves familiar with the difficulties and complexities of the subject, and we would respectfully urge, that

GRADUATING CLASS.

SUBJECT OF THESIS.

Howard C. Kearney,	Philadelphia	Pennsylvania	<i>Geranium Maculatum and its Syrup.</i>
James Kemble,	Penningtonville	Pennsylvania	<i>Cucurbita Citrullus.</i>
Charles Letts,	Bordentown	New Jersey	<i>Radix Sumbul.</i>
John C. Long,	Lancaster	Pennsylvania	<i>Jalapa, Extracta aquosa et Resina.</i>
William E. F. Mason,	N. Bridgewater,	Massachusetts	<i>Urtica Dioica, Common Nettle Root.</i>
Brewer Matlocks,	St. Paul	Minnesota	<i>Asclepias Tuberosa.</i>
James Meecray, Jr.,	Cape Island	New Jersey	<i>Buxus Suffruticosa.</i>
Decatur Milligan,	Lewisburg	Pennsylvania	<i>Aletris farinosa.</i>
Wilson H. Pile, Jr.,	Philadelphia	Pennsylvania	<i>Saccharum.</i>
Alfred J. Rankin,	Shippensburg	Pennsylvania	<i>Syrupus Rubi Villosi Compositus.</i>
Joseph Reel,	Philadelphia	Pennsylvania	<i>Polygala Senega.</i>
Elam Rhoads,	Norristown	Pennsylvania	<i>Asclepias Tuberosa.</i>
Clayton F. Richards,	Haddonfield,	New Jersey	<i>Stillingia Sylvatica.</i>
Nathaniel Richar lson,	Philadelphia	Pennsylvania	<i>{ Arsenic in connection with artificial manures.</i>
Thomas K. Scheller,	Chambersburg	Pennsylvania	<i>Spiraea tomentosa.</i>
Richard B. Sheridan,	Philadelphia	Pennsylvania	<i>Unguentum Mezerei.</i>
Robert J. Siddall,	Philadelphia	Pennsylvania	<i>Cimicifuga racemosa.</i>
Ephraim K. Smith,	Philadelphia	Pennsylvania	<i>Eryngium Aquaticum.</i>
J. Melancthon Stoeve,	Mechanicsburg	Pennsylvania	<i>Calamina.</i>
Charles Tuller,	Philadelphia	Pennsylvania	<i>Indigo.</i>
Wm. Henry Weatherly,	Freehold	New Jersey	<i>Oleum Gossypii.</i>
Charles Woods,	Danville	Pennsylvania	<i>Polygonatum Uniflorum.</i>

The minutes of the Board further inform of the election of Theodore A. Keffer to membership in the College.

John Bringham and F. C. Hill tendered their resignations from membership. On motion these were accepted, on the usual conditions.

The proposal to adopt a new Law to be called Law X. as submitted at the last stated meeting, being now considered and discussed, a motion was made and adopted, to alter the number 5 to 3 in the new Standing Committee, and then on motion the new law was finally unanimously adopted, the titles of Law X. and Law XI. being changed to Law XI. and Law XII.

Law X. of the Herbarium.

"A Standing Committee of three shall be appointed by the College at its meeting in September to keep the Herbarium in order, to collect plants, to place them in condition to be used in lectures on Botany, Materia Medica, Pharmacy, &c., to effect exchanges, and enter into correspondence with individuals, Societies and Colleges of our own and foreign countries."

The following Report was read by the Corresponding Secretary.

The undersigned, Corresponding Secretary of the College, begs leave to report that since the last annual meeting he has had occasion to notice the following matters pertaining to his office :

The subject of exchanging botanical specimens with the Swiss Apothecaries' Association, as presented in the Minutes of the meeting in September last, has since then remained entirely in the hands of the special committee appointed on that subject, as the direction given to that committee to open Correspondance, etc., with Dr. Fluckiger has rendered any further action from the Corresponding Secretary superfluous.

In October last a package was received from Mr. Charles Murray of Buenos Ayres, South America, containing four numbers of a pharmaceu-

tical journal published under the auspices of "the Pharmaceutical Association of Buenos Ayres" in the Portuguese language, and accompanied by a communication from Mr. Murray on behalf of Senor Francisco Solano Burgos, the Secretary of the Association, tendering their Journal to the Philadelphia College of Pharmacy. The communication was duly acknowledged by mail, and as soon as a fit opportunity occurs, it is proposed to forward our Journal in exchange.

At a Special Meeting of the College, held the 5th instant, it was directed that the Corresponding Secretary should forward to the Secretary of the Treasury of the U. S. a copy of the memorial then adopted in relation to the appointment of Special Examiner of drugs at this port, accompanied by an explanatory letter, and also to forward a copy to the President of the New York College of Pharmacy. The last was immediately sent with the requisite explanation, and as soon as the certified copy of the memorial with the seal of the College attached was received, it was at once enclosed in an appropriate letter and forwarded by mail to Washington. It is only necessary further to state, that in the communication to Mr. Meakim, forwarded with a copy of the memorial, the undersigned took advantage of the opportunity to acknowledge the reception of the copy of the first memorial of the N. Y. College of Pharmacy, and of the several Medical Societies of New York, through Dr. E. R. Squibb, Chairman of a joint Committee.

All of which is respectfully submitted,

WILLIAM PROCTER, JR.

The Committee on Sinking Fund made a Report, showing that since the last annual meeting they have paid one thousand dollars on account of the bond and mortgage secured upon the College building, which leaves the whole debt of the College at this date only two thousand dollars. On motion the Report was accepted.

The Latin Label Committee presented a statement of their transactions for the past year, showing a balance in their hands of \$625.00; it was read and accepted.

The Publishing Committee reported that the American Journal of Pharmacy has been issued regularly since the last report. By an arrangement with our fellow member, John M. Maisch, each number is furnished with a condensed *resumé* of the prominent items of the German journals, for which we have heretofore had to look to the English and French Exchanges. The Editor takes this opportunity to acknowledge the numerous valuable original communications which have been received from the same gentleman. By an arrangement effected through the agency of Mr. Charles Junghanns of Cincinnati, during a recent visit to Europe, some progress has been made in extending our German exchanges. By the annexed report of the Treasurer of the Committee, it was shown that the finances of the Journal have been influenced by the present disturbed state of the country, as would naturally be expected. The belief is expressed, however, that there will be no permanent injury to its circulation resulting from this cause, but that with the return of confidence in the business community the finances will improve.

On motion, the Report was accepted.

The following Report was read, and accepted:

The Committee on Botany respectfully report:—

During eight months of the past year, from April to November, we

have made 50 excursions, and collected about 400 species and varieties of phanerogamous plants, officinal or otherwise useful, either in medicine, the arts, or as ornamental plants.

Of these plants, we have remarked the following as growing wild: *Papaver somniferum*, *P. Rhoëas*, *Brassica rapa*, *Raphanus sativus*, *Viola odorata*, *Althæa rosea*, *Matricaria parthenium*, *Cannabis sativa*, *Asparagus officinalis*. All were found in the neighborhood of dwellings or farms, but with the exception of the last two, can scarcely be considered as sufficiently naturalized in this locality.*

We have commenced to prepare the *Collectio Plantarum Officinarum* as authorized by the College in September last; until now we have mounted on suitable boards 84 different species and varieties of plants, mostly of our own collection, all of which either are, or have been, or are likely to become, officinal; some others require to be mounted yet. Along with the plants from our own soil, we have also mounted the corresponding foreign species, likewise sections of the root, the fruit and the seed. Herewith we present to the College two of the cases prepared for the reception of this collection.

The plants collected by ourselves, and the various smaller collections in possession of the College, we are now busily engaged to arrange into the principal herbarium, for the better keeping of which we had some of the book cases altered, after obtaining an appropriation from the Board of Trustees. We expect to finish this work in about two weeks, when we will be ready to prepare our exchanges for Europe.

In accordance with the authority granted to us, we have entered into correspondence with various pharmacutists and botanists, both in the United States and Europe. Besides to Dr. Flückiger in Berne, we shall prepare a collection for Professor Theobald in Chur, and for Mr. Daniel Hanbury in London, who has consented to further our object by inducing some of his friends to exchange with us. On the European continent we are in hopes of having another correspondent through the influence of Professor Büchner in Munich.

The Committee feel indebted to Messrs C. A. Heinitzsch of Lancaster, Pa., F. Stearns of Detroit, Mich., Dr. Rob. Battey of Rome, Ga., and E. L. Massot of St. Louis, Mo., for the kindness and the zeal which they have manifested in securing us exchanges from their respective localities. Some of the gentlemen to whom we have been referred, have not yet directly expressed their inclination to exchange with us; but we believe that we shall enter upon our first year's exchanges with eight correspondents in this country and Europe.

It is obvious that your Committee will be kept very busy during the approaching season with collecting medicinal and other plants; most of those of our last year's collection will have to be gathered anew, to meet the probable demands; for a number we have to find new places of growth; and natural orders, which had to be more or less neglected last year, will receive more attention in consequence of greater facilities being offered after the expected arrival of the microscope. It shall likewise be our endeavor to complete as nearly as possible the officinal collection by next fall, so that it may be used in the lectures during the coming winter.

While the gathering of plants in the fields and forests of our neighborhood is connected with great pleasure, and, we hope, benefit to ourselves and the College, we wish to draw attention to a circumstance which

* NOTE. The list of plants collected, with the locality where found, we have had to omit for want of space. Editor.]

when carefully and judiciously carried out, may result in much good to the whole country. Among the plants growing spontaneously upon our soil, there are many troublesome and frequently worthless weeds, quite a number of which have been imported from foreign countries, and now thrive luxuriantly, having become entirely naturalized. But few really valuable plants are naturalized in a few localities in the United States, and it has occurred to your Committee to make an attempt, not to cultivate such, but to try whether some of them at least could not be made to grow spontaneously on this continent. Among those which we have in view are *Aconitum napellus*, *Atropa belladonna*, *Hyoscyamus niger*, *Colchicum autumnale*, *Anthemis nobilis*, *Matricaria chamomilla*, *Digitalis purpurea*, &c. We invite the co-operation of all pharmacutists in this, in our opinion, important project, and while we are ready to impart any information thereon, in our power, we should feel obliged for any aid extended to us.

With the number of pharmacutists who graduate every year in Philadelphia, our College becomes connected by many ties with the various sections of the North American continent and the West Indian Islands. Undoubtedly it would be gratifying to the institution in which they completed their pharmaceutical education, if they would remain in scientific intercourse with it. A pleasant and ever gratifying field of their labor would be, amongst others, the culture of botany, and your Committee would gladly enter into exchanges with them. We now take pleasure to inform you that two former pupils of the College, Mr. Maurice W. Alexander, of St. Louis, Mo., and Mr. Geo. E. Hays, of Athens, Ga., have signified their willingness to assist us in the collection of a general herbarium, by supplying us with plants from their localities. It is our hope that others may follow.

Signed,

JNO. M. MAISCH,
WILLIAM R. WARNER,
of the Committee.

On motion of Robert England, a vote of thanks was unanimously tendered this Committee for their zealous and efficient labors. They were continued until the election of the Standing Committee on Herbarium, as provided by Law X.

On motion the College took a recess, for the purpose of electing Officers, Trustees and Committees.

Robert England and H. F. Geyer were appointed Tellers, whose Report was as follows :

President.—CHARLES ELLIS.

1st Vice President.—Samuel F. Troth.

2d Vice President.—Dillwyn Parrish.

Treasurer.—Ambrose Smith.

Recording Secretary.—Edward Parrish.

Corresponding Secretary.—William Procter, Jr.

Eight members of the Board of Trustees.

Dr. Robert Bridges,

S. N. James,

J. C. Savery,

D. S. Jones,

T. S. Wiegand,

J. T. Shinn,

S. S. Bunting,

T. M. Perot,

Publishing Committee.

W. Procter, Jr.,
C. Ellis,

E. Parrish,
J. M. Maisch,

A. B. Taylor.

Committee on Sinking Fund.

S. F. Troth,

A. Smith.

E. Parrish.

Delegates to the American Pharmaceutical Association.

C. Ellis,

W. Procter, Jr.,

E. Parrish,

J. Clarkson Griffith.

On motion, the delegates were empowered to add an additional member to their number and to fill vacancies.

Then on motion the College adjourned.

EDWARD PARRISH, Secretary.

Editorial Department.

THE NEXT MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.—But four months are to elapse before the period set for the next meeting of the Association will arrive. It is very desirable that those who have accepted subjects for investigation, should be prepared to report on them, whether they are able to get to the meeting or not. In view of the disordered condition of public affairs, it is doubtful whether there will be a large attendance even from places adjacent to the place of meeting, and it is all the more important that the reports should go on, so that at least some interest may be obtained for the Proceedings of 1861. As a *scientific* body, national and even continental in its scope, the American Pharmaceutical Association should live on through all changes of a political character, and hence, whatever else be done, it is of vital importance that the regular preliminary forms for the meeting should be carried out, and that a meeting should occur, if but a dozen members be present. It will be for the President to issue his call in the July number of this and other Journals, and it is to be hoped that ere the period of convening, the dark clouds which now lower over our beloved country will be dispersed.

DRUG EXAMINERS.—By reference to the Minutes of the College, at page 281, it will be seen that a memorial has been sent to the Secretary of the Treasury, urging the importance of more care in the appointment of these officers as regards their fitness for the duties of their office. It is hardly

probable that, under the present state of public affairs, much attention will be given to this matter, but the importance of the subject should not be lost sight of, when the proper period arrives.

OUR SCHOOL OF PHARMACY.—It is with pleasure that we refer to the list of graduates in Pharmacy, at page 282, which is the largest graduating class that has yet received the honors of our College. It will be seen on examination that the list includes a considerable number who are not Philadelphians. Some of these are from the South and West. It is encouraging to observe the increased interest that has been manifested of late years, in regard to a better education among pharmacutists. Young men who have served three or four years in Maine, Georgia, Ohio and other States, or in Cuba, have come on and subjected themselves to the expense and inconvenience of a two winters' sojourn in our city, in attendance on lectures in order to get information and a diploma. Under these circumstances it is of the utmost importance that the accessories to pharmaceutical education be increased and perfected as far as possible. Among these accessories yet in the future, is a school of Practical Pharmacy, where young men can perfect themselves in manipulation of the higher grades. The expense attending a school of this kind, has heretofore, and probably will for some time, prevent its establishment as a part of the operations of our College of Pharmacy, but it must eventually become an important feature of the tuition extended.

THE GREAT EXHIBITION AT LONDON IN 1862.—Already the English Journals are calling attention to the fact, that it has been determined to hold another "World's Exhibition" at London, in 1862, and that Pharmacy should be represented there. It is doubtful whether, in the present condition of this country, much attention will be attracted from the inventors and manufacturers of the United States.

A Colloquy on the Duties and Elements of a Physician. By THOMAS S. POWELL, Professor of Obstetrics in Atlanta Medical College. Written at the request of his private class. Atlanta, Georgia, 1860. pp. 68. 18mo.

We acknowledge the reception of this little volume from the author. As its title asserts, it is intended to convey, in an agreeable and easy form, valuable information in regard to the ethical relations of the physician.

O'Reilly on the Placenta, and the phenomena connected with the animal and organic nervous system. By JOHN O'REILLY, M. D., New York, 1861, pp. 46. Octavo.

From the author.

THE
AMERICAN JOURNAL OF PHARMACY.

JULY, 1861.

ON THE ORIGIN OF BAY RUM.

BY JOHN M. MAISCH.

Bay rum is a distilled spirit imported into the United States from St. Thomas, and probably other West Indian islands. It has a very agreeable and lasting aromatic odor, and is extensively used as an external stimulant application, particularly to the hair. To what extent it is known in continental Europe I am unable to say; I do not, however, recollect of having met with it there. That it is little known in Europe may also be judged from the fact that it is not even mentioned in Piesse's Art of Perfumery.

With us it is an article of commerce, of perfumery, and, to a certain extent, of medicine; but its origin has never been made known. I believe that it was popularly supposed to have been derived from the leaves of *Laurus nobilis*, Lin., probably for no other reason than because of the English name of sweet bay for this species. The leaves, however, though aromatic, possess an entirely different odor and taste from that of bay rum; besides, this sweet bay is a native of Asia Minor, and is cultivated and naturalized in Europe south of the Alps. There are numerous aromatic Lauraceæ indigenous to the western hemisphere, and it is scarcely to be supposed that the former would be cultivated merely for the purpose of obtaining a distillate from the fresh leaves, for the dried leaves and berries are little employed here, and the market is kept well supplied from Southern Europe.

But the name of "bay" is by our people not solely applied to the above species of *Laurus*; various odoriferous shrubs and trees, like the magnoliæ, which have coriaceous or sempervirent

leaves, or showy and sweet scented flowers, have the same distinction conferred upon them. From the English name, therefore, no clue can be had as to the origin of bay rum.

A short time ago, Mr. F. L. John, of this city, handed me a leaf, which had been brought to this country in 1854 by a captain trading with the West Indies, and who asserted it to be from the same plant from which bay rum is obtained. This assertion is verified by its odor and taste, which are identical with that of the commercial spirit. The leaf is so different in its character from our indigenous Lauraceæ, like *Sassafras officinale* and *Benzoin odoriferum*, and from *Laurus nobilis*, that Mr. John supposed it to be the leaf of a *Viburnum*. The leaves of this genus of *Caprifoliaceæ*, however, are never coriaceous, but deciduous and mostly serrate or toothed, or even lobed; their venation is also very different from that of the leaf in question.

Having occasion to examine the herbarium at the Philadelphia Academy of Natural Sciences, I found among the Lauraceæ a twig without flowers or fruit, labelled *Laurus* — ?, and with the remark that it had been collected in the island of St. Croix by the late Dr. Griffith, and that it was the plant from which bay rum is obtained. Subsequently, Professor Dr. Bridges called my attention to the circumstance that the leaves are perforated with numerous pellucid dots, which exclude the plant from the natural order Lauraceæ, and he suggested that it was most likely a member of the Myrtaceæ, and probably *Myrcia acris*, De C.

The twig is of a cinereous to yellowish brown color, covered with granular spots, mostly of a brown color; it is irregularly quadrangular, the sides being narrowest where the opposite petioles are attached, and gradually becoming broader above and below to the next pairs of leaves which grow from the sides alternating with the former, thus giving to the twig a somewhat twisted appearance. The petioles are about $\frac{1}{3}$ inch in length, granularly dotted, and with a groove on the upper side, the continuation of the groove of the midrib; they rise from the branch at an angle of 45 to 50°; a transverse section exhibits a hard, light colored, ligneous crescent, surrounded by a thick brown spongy layer, covered by the epidermis, while the centre of the slender branchlet is occupied by a brown porous pith, covered

with a layer of hard, reddish white wood and the bark. The leaves are $2\frac{1}{2}$ to 4 inches in length, and vary in shape from oblong to elliptic; they are rounded, or the smaller ones somewhat attenuate at apex or at both ends, obtuse, entire, with the margin revolute and somewhat wavy. The midrib sends out at angles of about 80 to 85° numerous parallel veins, irregularly connected with each other and confluent near the margin in a vein nearly parallel with it. The midrib bears a groove on the upper surface, and is much elevated beneath; the veins are elevated on both sides, but most prominent above. The color of the leaves, which were collected many years ago, is dark brown green, lighter beneath. When rubbed they emit the peculiar odor of bay rum, and their taste is warm aromatic, resembling allspice and cloves to a certain extent. The leaf from Mr. John agrees with this description in every respect, except that it is obovate and has a light green color, which is more greyish green beneath.

Knox's St. Thomas, W. I., a small volume, contains a list of plants growing in that island, among which is *Myrcia acris*, DeC., with the English synonym *bayberry tree*; the work contains a chapter on the commerce of the island, but I was disappointed in not finding the slightest allusion to bay rum.

Curtis's (London) Botanical Magazine, new ser. vi. No. 3153, contains a colored plate of *Myrcia acris*, which agrees pretty well with the leaves, and gives the following description and information, from the former of which I extract that part bearing on the leaves and branches:

“*Myrcia*.—Folia opposita integerrima pellucido-punctata aut opaca, nervatione Myrti donata.

M. acris (De C. Prod. iii. 243).—Foliis ellipticis obtusis convexis coriaceis glaberrimis superne venis elevatis reticulatis subtilissimis pellucido-punctatis.

Synon.—*Myrtus acris*, (Sw. Fl. Ind. occ. ii. 909. Willd. Sp. pl. 973. Ait. Hort. Kew. ed. 2, p. 190. Sprengel Syst. Veget. ii. 487.)

Myrtus caryophyllata, (Jacq. Obs. ii. 1,) non Linn.

Caryophyllus L., foliis oblongo-ovatis oppositis, racemis lateralibus et terminalibus, (Browne's Jamaica, 247.)

Caryophyllus aromaticus Indiæ occidentalis foliis et fructu rotundis, (Pluk. Alm. 88, t. 155, f. 3.)

Description.—A tree, according to Swartz, clothed with a grey, brown bark. Branches compressed, in our dry specimens, (but Swartz describes them as terete), four-angled, often marked with very minute, raised points, glabrous. Leaves opposite, 3 to 5 inches long, very coriaceous, elliptical obtuse, convex above, the margins revolute, waved and subtortuose with many parallel, nearly horizontal nerves united by reticulations which are most apparent on the upper side (where are impressed dots) and in the dry state, beneath pale with discolored not depressed dots."

Lunan, the author of "*Hortus Jamaicensis*," thus speaks of this plant: "It may contend with most trees for the palm of elegance; it grows slowly and attains a considerable size. The trunk is handsome, straight, forming a very lofty, thick and beautiful pyramid. In the younger trees the bark is brown, then ash-colored, and finally white with yellow spots, very smooth and even, but sometimes hanging down in slender shreds; it has an astringent, somewhat aromatic flavor. The timber is very hard, red and ponderous, capable of being polished and used for mill cogs and other purposes where much friction is required. The young branches are sharply four-angled and green, their leaves 3 to 4 inches long, of a very sweet aromatic smell, and, on account of their agreeable astringency, often used as a sauce. The flowers are small, white, with a slightly reddish tinge; the berries round, as large as peas, having an aromatic smell and taste, which render them agreeable for culinary purposes; they contain seven or eight seeds.

The tree is a native of the West Indian islands, and is called in Grenada *Bois d'Inde*. Browne says, it is common in Antigua and Jamaica as well as Barbadoes, and generally attains a considerable size; that it fills the woods with the fragrant smell of its leaves, nearly resembling that of cinnamon, but its bark has none of the warmth of that of cinnamon, though the berries much resemble cloves both in form and flavor. It is commonly called *wild cinnamon*, or *wild clove tree*, and it is said to be the *bayberry* of Hughes."

In Guibourt's *Histoire Naturelle des drogues simples*, 4me ed. iii. 254, 255, the author speaks of "*piment couronné ou poivre*

de Thevet." From this article I translate the following, bearing on our subject:

"It comes from the Antilles, and principally from the Island St. Vincent, where it is produced from *Myrtus pimentoides*, Nees ab Es. (*Myrcia pimentoides*, De C.) This tree completely resembles *Myrtus acris* in the leaves, which are oval-obtuse or elliptic, coriaceous, strongly veined, wholly covered with glandular dots, and in the disposition of the flowers in trichotomous panicles; but it differs in the fruit, which in the former is oval.

After a full description of the fruit, the author continues: "I believe that it is the latter species, *Myrtus pimentoides*, which has been described by Plukenet under the name *Caryophyllus aromaticus americanus*, folio et fructu oblongo, polypyræne, acinis angulosis uvarum vinaceis similibus; sweet bay barbadensis dicta, (Phytogr. tab. 155, fig. 2.)

De Candolle, however, gives in his *Prodromus* the following description of

Myrcia pimentoides.—Foliis ovalibus coriaceis omnino opacis nitidis, ramulis acute tetragonis pedicellisque glabris.

The same author mentions 24 species of *Myrcia* growing upon the West Indian islands, nearly all of which are pellucid punctate, and many with acuminate leaves.

Lindley, in his *Flora Medica*, remarks of *Eugenia* (*Myrcia*) *acris*, W., "It is supposed to have been confounded with *Eugenia pimentoides*, in whose aromatic qualities it altogether participates."

I have no doubt that the leaves under consideration have been derived from *Myrcia acris*, which is at least one of the sources of bay rum, the medicinal name of which must consequently be *Spiritus Myrciæ*. But it is very probable that various species of the same genus are made use of for the same purpose. Whether this is really the case must be settled by well authenticated species bearing flowers and fruit, procured from the various islands which furnish us with bay rum. Our importers ought to take this matter in hand, and cause to have proper specimens sent to them. It affords me great pleasure to mention that Mr. Elias Durand has already kindly offered to procure some.

Philada., May, 1861.

ON PHOSPHATE OF SESQUIOXIDE OF IRON.

BY EMILE HEYDENREICH.

(An Inaugural Essay.)'

For several years various compounds of phosphorus, oxygen and iron, either by themselves dissolved in acids, or combined with some alkaline salts have been used to a considerable extent. Among these, the compound syrup of the phosphates of iron, soda and lime, (the chemical food,) the so-called syrup of superphosphate of iron, and the glyceroles and syrup of hypophosphites of iron have been most generally used. The pyrophosphate of the sesquioxide of iron has also been brought forward by some French chemists, but did not come into use till it was offered by the late Mr. E. Robiquet, of Paris, in combination with the citrate of ammonia, with which it forms a soluble salt. The extended use which this latter salt has obtained, and the little notice which had been taken of the other compound of phosphoric acid and sesquioxide of iron, led me to make some experiments in this direction. The varied basic character of the phosphate of soda, from which corresponding metallic salts may be usually obtained, would naturally lead one to suppose that similar compounds of the sesquioxide of iron might be obtained by adding to a solution of them, solutions of a sesquisalt of iron. This has been verified in the case of the pyrophosphate of iron, $2\text{Fe}_2\text{O}_3, 3\text{PO}_5$: the reaction being $3(2\text{NaO}, \text{PO}_5) + 2(\text{Fe}_2\text{O}_3, 3\text{SO}_3) = 2(\text{Fe}_2\text{O}_3)3\text{PO}_5 + 6(\text{NaOSO}_3)$. According to this, by using the tribasic phosphate of soda, instead of the pyrophosphate, we might expect the reaction to be $3(2\text{NaO}, \text{HO}, \text{PO}_5) + 2(\text{Fe}_2\text{O}_3, 3\text{SO}_3) = (2\text{Fe}_2\text{O}_3, 3\text{HO}, 3\text{PO}_5) + 6(\text{NaO}, \text{SO}_3)$.

On carefully adding to a solution of tribasic phosphate of soda, a solution of tersulphate of sesquioxide of iron to saturation, a bulky white precipitate was obtained; the supernatant liquid was found to be decidedly acid to litmus paper. The precipitate was washed by decantation several times, thrown on a filter, allowed to drain, and finally pressed between bibulous paper. It was afterwards dried on a sand bath till anhydrous, when it was analysed to ascertain its composition; during the washing and drying, the precipitate assumed gradually a yellow tint.

One hundred grains were fused with some carbonate of soda, the mass left after ignition was removed from the crucible, introduced into a dish with some water, and every portion of oxide of iron carefully washed from the crucible; this mixture was allowed to boil, and sufficient acetic acid added to neutralize the excess of carbonate of soda. By this means, all the sesquioxide of iron was precipitated, while the clear liquid contained the phosphate of soda with some acetate of soda. The sesquioxide of iron was collected on a filter, washed and ignited; to the solution of phosphate and acetate of soda, a solution of chloride of ammonium, of sulphate of magnesia and of ammonia was added; by this means the double phosphate of magnesia and ammonia was precipitated, which by ignition furnished the pyrophosphate of magnesia, from which the phosphoric acid was calculated. The result of two analyses carefully performed was:

1st Exp.	Fe_2O_3	52.50,	2d Exp.	Fe_2O_3	52.00
"	$2\text{MgO}, \text{PO}_5$	73.00,	"	$2\text{MgO}, \text{PO}_5$	74.00

112 parts $2\text{MgO}, \text{PO}_5$ being equal to 72 parts of PO_5 , the following is the result:

1st Exp.	Fe_2O_3	52.50	} 99.42
"	PO_5	46.92	
2d Exp.	Fe_2O_3	52.00	} 99.57
"	PO_5	47.57	

These results correspond in composition with the phosphate of sesquioxide of iron $\text{Fe}_2\text{O}_3\text{PO}_5$, mentioned by Will in his "Outlines of Chemical Analysis," and by Dr. Graham, in his "Elements of Chemistry." The reaction, therefore, must be between one equivalent of phosphate of soda, and one of tersulphate of sesquioxide of iron, by which are formed: one eq. phosphate of sesquioxide of iron, 2 eq. of sulphate of soda, and one of sulphuric acid, which remains in the water: $2\text{NaO}, \text{HO}, \text{PO}_5 + \text{Fe}_2\text{O}_3, 3\text{SO}_3 = \text{Fe}_2\text{O}_3, \text{PO}_5 + 2(\text{NaO}, \text{SO}_3) + \text{SO}_3, \text{HO}$.

Some further experiments were now tried to ascertain its solubility in some solvent, which might render it useful in medicine.

In hydrochloric and nitric acids, it is readily soluble; in phosphoric acid it is insoluble; in citric and tartaric acids, it is slightly soluble, more so on the application of heat, forming green solutions. In phosphate of soda it is insoluble, even

when heated; in tartrate of ammonia it is slightly soluble, forming a green solution, which, when heated to boiling, is decomposed, forming a gelatinous mass.

Citrate of soda dissolves it in considerable quantity, but the best solvent for it is the neutral citrate of ammonia proposed by Mr. Robiquet, as a solvent for the pyrophosphate of iron. In this salt it dissolves readily, forming a green solution with a brown shade; when evaporated and spread on glass, and dried, it forms scales of a brownish green color, which much resemble those of the citro-ammoniacal pyrophosphate of iron. The dry salt dissolves more rapidly in cold water, than the pyrophosphate, and has a pleasant saline taste; a solution of it on the addition of ammonia, remains clear, but turns to a reddish brown color, while the addition of a portion of citric acid turns it to a lighter green color.

100 parts of this salt on examination, were found to lose 10 parts of water, and furnish 23 parts of Fe_2O_3 which correspond to 44 parts of $\text{Fe}_2\text{O}_3, \text{PO}_5$, the remaining 46 parts being the citrate of ammonia. We have thus a citro-ammoniacal sesquiphosphate of iron, which is a reliable preparation, containing 23 per cent. of sesquioxide of iron, and possessing decided advantages over most ferruginous preparations, on account of its pleasant taste, while it will prove more active than the citro-ammoniacal pyrophosphate of iron, as it contains more iron. We may, therefore, hope that a fair trial of this new salt by the medical profession will gain for it the place to which its composition would seem to entitle it.

ON THE VOLATILE OIL OF MYRCIA ACRIS.

By JNO. M. MAISCH.

Together with the leaf of which I treated in another paper, Mr. F. L. John handed me some of the volatile oil contained in bay rum.

This oil is of a bright brownish golden yellow color, limpid, and has an agreeable aromatic odor, strongly resembling allspice, mixed with a little cloves, and faintly reminding of cinnamon; its taste is warm and pleasantly aromatic. It evaporates from

paper with some difficulty, but without leaving any stain behind. It is lighter than water; on account of the small quantity which I received, I could not ascertain the specific gravity directly, but as it floats in diluted alcohol, and rises very slowly to the surface, it must be near .930. It is readily soluble in ether, from which solution it is precipitated by alcohol of .835 spec. grav. With alcohol, a clear solution cannot be obtained; if a single drop is added to half a fluid ounce of 85 or 95 per cent. alcohol, it sinks to the bottom, marking its passage down by a milky streak, and on agitation a white turbid fluid is obtained, which gradually deposits a white film, leaving the supernatant liquid clear. Dropped into diluted alcohol, it is not dissolved, and by slight agitation the large drop may be divided into numerous minute perfectly transparent globules floating in the alcohol and yielding by continued shaking a very opaque milky mixture, which slowly separates on the surface an opaque oily film, collecting afterwards into minute transparent globules. Odor and taste of these alcoholic solutions approach that of bay rum very much; the difference in the odor and taste of the latter must be ascribed partly to the use of another spirit, and partly to the direct distillation from the leaves, by which process other volatile bodies besides the oil distil over. The alcoholic solution has a slight acid reaction.

The behaviour of this oil to the various reagents proposed for the volatile oil, is as follows:—

Solution of Caustic Soda dissolves a portion of the oil to a golden yellow liquid, gradually becoming transparent; a yellowish brown oily stratum collects on the surface; after 24 hours the oily stratum has disappeared, and colorless flat prisms are deposited.

Nitric acid.—The color changes to orange, brownish yellow, brownish red, and reddish brown; now an evolution of gas takes place, and the oil congeals to a soft, dark, reddish brown resin, which becomes hard and friable, and assumes more of the reddish tint.

Sulphuric acid.—The oil changes to a brown resin, having a shade of red, and soon becoming hard; the acid has a brown color.

Iodine.—Solution takes place slowly and without any visible

reaction; the liquid assumes the consistency of thin honey and a brown iodine color; odor scarcely modified.

Ethereal solution of iodine produces little spreading; the mixture has at first an iodine color, which changes through brownish carmine into a bright yellowish red, and gradually assumes a browner tint; consistence after 24 hours, syrupy; odor as before.

Bromine produces a hissing noise, effervescence and a dark yellow resin.

Ethereal solution of bromine occasions spreading and a greenish black color, altering to blackish brown, with deeper colored streaks, the whole readily miscible to a pale brownish black thin liquid, which, after 24 hours has the consistence of honey; odor little altered.

Nitroprusside of copper.—The color passes through greenish, greenish brown, and blackish brown into brown black; the odor remains unaltered.

The sparing solubility in strong alcohol and the precipitation from the ethereal solution by alcohol of .835 is a very peculiar behaviour of *Oleum myrciæ*, and its coloration by nitroprusside of copper appears to be its most important reaction, it being, so far as known, the only volatile oil, which, during the change of color, has, for a second or two, a greenish hue. Oil of cloves with its violet and cherry red, and oil of cassia with its hyacinthine red coloration, are readily detected, if added in small quantity. Oil of allspice has not been examined yet. The carbonhydrogens show their presence by preventing the reaction. If *Oleum myrciæ* should become an article of commerce, no adulteration could be practised without the certainty of detection by this valuable reagent. At my earliest opportunity, I shall likewise investigate the behaviour of *Oleum pimentæ*.

My attention has been drawn to the fact, that a well known English pomatum, sold under the name of Myrtle Pomatum, has an odor closely analogous to this oil, which has probably been derived from *Myrcia acris*, De C., or an allied species. This pomatum keeps well for a long time without becoming rancid; it is possible that this may partly at least be the result of the flavoring ingredients.

ON THE RESINOIDS.

By J. M. ABERNETHY.

(An Inaugural Essay.)

The subject of this "Thesis" having been suggested by my preceptors, as one worthy of considerable attention, from the fact of the increased interest given to it by the Medical Journals, both in this country and in Europe, and the apparent success that is now attending the use of the resinoids among the Eclectic Practitioners, who claim them to be the active principles of the drugs from which they are obtained, and who assert, with considerable truth, that every plant contains in a measure more or less inert matter of little value, and which in the form in which they are generally given tends only to increase their bulk whilst they deter their absorption into the system, and not only keep the patients in suspense, but nauseate them by the bulk of the medicine they are obliged to digest.

The Eclectics consider that in the form of a resinoid, not only do they get rid of an excess of inert matter, and obtain a medicine in one of its most concentrated forms, but which from the smallness of its bulk, its ready solubility in the juices of the stomach, and its rapid absorption into the system, produces at once both a rapid and energetic action.

Their method of preparing these medicines being, as it were, in its infancy, but little is known concerning them by Pharmacutists in general. Hence the dispensing of them must necessarily be more or less confined to the few who have made this branch of pharmacy their more immediate study. Druggists, generally, would do well to give this subject a passing notice, and endeavor to ascertain whether or not these resinoids do really possess the active properties attributed to them. Should such be the case, and the demand for them still continue to increase in the same ratio as heretofore, it will be necessary to introduce these as a new class of preparations.

Hence, my object in experimenting with these resinous principles will be to endeavor with the assistance of the few works devoted to this subject, to show the manner in which Eclectics prepare these resinoids, with the relative amount of resinous prin-

ciple, combined with a fixed and volatile oil, contained in some of the leading and most useful plants.

My first experiment with the roots of the *Helleborus Niger*, was with the view of obtaining the so-called active principle in a crystalline form, said to have been isolated by Mr. William Bastick, and written upon by him, and read before the Pharmaceutical Society of London. The researches of Vauquelin and Capron, who gave this subject particular investigation, point to the conclusion that no such principle exists in a crystalline form, but that the activity of the root is due solely to a fatty oil in combination with a volatile acid, which they separated from it.

Doubting the truth of their conclusions, I supposed by the improved methods of research of the present day that an organic base might be eliminated from it. Of the two processes given by Mr. Bastick for eliminating the active principle, the following I manipulated with great care and accuracy.

Experiment 1st. Five pounds of the root *Helleborus Niger* was reduced to a coarse powder, and macerated in a sufficient quantity of alcohol for fourteen days: it was then percolated, *by funnel process*. The tincture was filtered, then diluted with water, the alcohol evaporated off, again filtered in order to remove the separated resin, and the solution afterwards evaporated and set aside to crystallize: after allowing it sufficient time, and finding no crystals, the resulting liquor was again evaporated to the consistence of an extract; it was triturated with carbonate of magnesia in order to neutralize any free acid which might exist, to prevent its crystallization: it was then washed with hot water, and thrown on a filter, and additional water added; the filtered liquor thus obtained was evaporated and set aside to crystallize; and obtaining no crystals, I was induced to examine his first method.

Experiment 2d. Two pounds more of the root were finely bruised, and macerated in alcohol containing 1-50th part of strong sulphuric acid; after standing a sufficient length of time, the tincture was expressed, and filtered, and supersaturated with calcined magnesia: the liquid was then filtered, and sufficient sulphuric acid added to it to render it slightly acid; it was again filtered to remove the sulphate of magnesia formed. The fil-

trate was now mixed with twice its volume of distilled water, and the mixture evaporated to expel the alcohol, and to reduce considerably the bulk of the solution. In order to remove the soft resin, filtration was resorted to, the concentrated liquor was carefully saturated with carbonate of potassa, but nothing was precipitated. A large excess of that carbonate was now added, and the solution agitated with four times its volume of ether, and afterwards set aside, that the ethereal part of the liquid might separate from the watery portion. When this separation had taken place, the ethereal portion was removed by a pipette, and exposed to spontaneous evaporation in a capsule. According to Mr. Bastick, this ethereal solution produced no reaction on litmus; but on the contrary, according to my experiments, the solution had a decided acid reaction, and produced no crystals, but a soft dark colored resin, insoluble in water, slightly soluble in alcohol, and readily soluble in ether, bitter to the taste, and producing a tingling sensation on the tongue, like that of the root. I then determined, if possible, to ascertain whether or not its activity did exist in the separated resin. I took five grains of the resin, and in the course of two hours I began to experience the given characteristics of the drug, and in a short period of time it produced three copious evacuations with a nauseating sensation. Hence my candid belief is, so far as my experiments will support me, that the so-called Helleborin of Mr. Bastick is simply crystals of a salt of potassa.

PODOPHYLLIN.

There is probably no subject in the vocabulary of American indigenous plants which has baffled the minds of Pharmaceutists more than that concerning the principle or principles existing in the root of *Podophyllum peltatum*. After much research over the results of the most recent experimenters, but little light has been given to the subject since the paper published by William Hodgson, in the *American Journal of Pharmacy*, volume third, page 273, 1832; in which he describes it as being the bitter principle, and which has been considered as Podophyllin, and prepared in the following manner: One pound of the dried root was boiled in six pints of water for half an hour, the decoction then strained off, and the residue pressed. The liquor was some-

what turbid, of a brown color ; two fluid ounces of aqua ammonia being thrown in, rendered it perfectly limpid, presently produced a crystalline earthy precipitate, which, when dry, weighed 78 grains. The clear liquor was then evaporated to one-fourth of its original bulk. The free ammonia had of course escaped. On cooling, a pellicle formed on the surface, and a semi-crystalline flakey matter was deposited, copiously enveloped in a gelatinous mass. In order to separate the semi-crystalline matter he diluted the whole with cold water, and decanted off the clear liquor, which conveyed away with it most of the gelatinous mass. That which remained was nearly dried, and treated with alcohol of sp. gr. .825. The solution thus obtained was filtered and evaporated by a water bath, depositing, towards the end of the process, the original semi-crystalline substance in the form of a brownish yellow granular mass. Suspecting that it was not yet in a state of purity, and having observed its sparing solubility in cold water, I subjected it to a boiling heat in distilled water ; when it entirely dissolved, except a slight portion of impurity. As soon as the solution was allowed to cool this substance separated in extremely small flocculent crystals, slightly heavier than the water. In order to prove its supposed cathartic effect, half a grain was taken, and after the lapse of a reasonable length of time, it produced a mild cathartic effect, which convinced me that the bitter principle obtained by Mr. Hodgson proved to be a cathartic, having a slight drastic effect. When dry, this substance, after being purified, was obtained in beautiful straw colored scales of considerable brilliancy, easily pulverizable, slightly deliquescent in the air, and having a strong bitter taste, very permanent, but not at first apparent, owing probably to its difficult solubility, as the alcoholic solution is excessively bitter ; soluble in strong alcohol ; slightly in cold, and much more in boiling water ; slightly soluble in sulphuric ether. When dry it has but little odor, the solutions having a peculiar smell, somewhat resembling that of the root ; with sulphuric acid, an olive green color passing afterwards to a purple ; exposed to heat alone, it fuses, blackens, and dissipates in a dense smoke.

The most important of these active principles possess in general the properties of the common resins, viz. fusibility, inflammability, solubility in alcohol and not in water, etc. ; but as they are

not liquifiable by heat, and differ somewhat in other respects from the pure resins, they are termed "Resinoids."

Many of them may be obtained by the following simple process: form a saturated tincture of the root or plant desired, which is best done by displacement, or by macerating the ground material in strong alcohol, and expressing; from this tincture distil or evaporate off the alcohol, having previously added plenty of water; the alcohol, which held the resin in solution, being thus removed, and the resin not being soluble in water, it is precipitated, while the other substances which the alcohol had dissolved out, as the extractive and coloring matter, being also soluble in water, are held in solution by the water, and thus separated from the resinoid.

The precipitate was then collected and purified by frequent washing, or by being redissolved in alcohol and again precipitated, and was then dried and powdered for use.

Thus may be prepared the resinoids, Podophyllin, Cimicifugin, Leptandrin, Helleborin, Sanguinarin, Caulophyllin, and numerous others, experimented on, but not above mentioned.

By the above process, the resinoid is not obtained in its chemically pure state; it probably contains from two and a half to five per cent of coloring matter and extractive, which, however, does not sensibly affect its use as a medicine: while a further purification would not only add to its cost, but might even endanger its activity. Its complete purification must be effected by redissolving it in alcohol, digesting the solution with animal charcoal, filtering, and again precipitating by water.

Perhaps these investigations have been more extended than the importance of the subject may appear to warrant; but this subject of the Resinoids under consideration is one of those of which the apothecaries have but little knowledge and it may be an inducement for other experimenters to take hold of the above, and go more fully into the subject.

[NOTE.—The author's remark at page 301, that but little light has been thrown on the subject of Podophyllum since 1832, is certainly incorrect, inasmuch as the resinous nature of the active principle was ascertained by Lewis, in 1846. Whatever relation the product of Mr. Hodgson's formula bears to the resin of Lewis, or the crude resinoid of commerce, it probably either owes its activity to that principle, rendered soluble by aid of associated substances in the water of the decoction, or is a modified form of the resinoid.—EDITOR AMER. JOURN. PHARM.]

ON FERRATED TINCTURE OF CINCHONA.

BY JNO. M. MAISCH.

On pages 193—197 of this volume I have published my observations on the precipitates, occurring in the various tinctures of cinchona bark, prepared with diluted alcohol. It is evident that such tinctures are entirely unsuited for the preparation of ferrated tincture of bark, and the following experiments were therefore conducted with a simple tincture of calisaya bark, obtained by percolation with alcohol of .877 spec. grav. This tincture has been exposed to the oxidizing influence of atmospheric air for more than three months, care being taken to prevent the evaporation of alcohol, and no precipitate has appeared yet.

Before discussing the results of my experiments, it will be well to take a view of the organic constituents of bark, those of inorganic nature being small, not exceeding $2\frac{1}{2}$ per cent., and mostly insoluble in alcohol. Besides cellulose, cinchona bark contains according to Dr. E. Reichardt, alkaloids, ammonia, kinic, kinovic, cinchotannic, oxalic, rufocinchotannic and humic acid, sugar and wax. Of these constituents wax and humic acid are insoluble in alcohol; oxalic acid is combined with lime; sugar, ammonia and kinovic acid are not important, the latter reaching in calisaya bark not quite .7 per cent. Only the alkaloids and the three acids, kinic, cinchotannic and rufocinchotannic are therefore left.

If the above mentioned tincture of bark is mixed with a solution of a neutral persalt of iron, a flocculent or voluminous precipitate takes place, while the liquid assumes a more or less inky color. The precipitates contain besides the tannin also kinic acid, while a small portion of kinic acid remains in solution. Rufocinchotannic acid is doubtless precipitated with the other; but its quantity in calisaya bark is insignificant, reaching only .722 per cent. No alkaloids are found in the precipitates after they have been washed with alcohol of .877.

The same acids are found in the residue on the filter after the tincture has been treated with freshly precipitated oxide of iron, but a larger proportion of kinic acid remains in solution and occasions on the addition of a neutral ferric salt a turbidity and

gradually a precipitate in which the presence of kinic acid can be readily proved, but which is free from alkaloids.

Which medicinally important organic constituents remain now in the tincture? Besides a minute proportion of kinic acid, if that be important at all—only the alkaloids, and these not in the same combination in which the bark originally contained them. Such a ferrated tincture of bark is therefore essentially nothing but an alcoholic solution of the citrates of the alkaloids and iron, together with minute quantities of sugar and probably of a compound of iron with some product of decomposition of cinchotannic acid, to which it owes the darker color, unless that be due to altered alkaloids, (chinoidine.)

I contemplated at one time to use a lead salt, acetate of lead, for precipitating tannin; but all the other soluble acids are likewise precipitated by this reagent, and more completely so, than by iron. Such a process is therefore likewise unfeasible.

Upon the whole, I have come to the conclusion that a ferrated tincture of bark is a preparation deserving neither to be countenanced by pharmacutists, nor the confidence of the physician. All that is really valuable in it we can have, in more definite and consequently more reliable form, by making a solution of citrate of quinia or cinchonina and citrate of iron, either in water, in wine or some other alcoholic liquid. If a citrate of quinia, and perhaps also a citrate of cinchonina was officinal, these preparations might be employed by themselves, and if the physician wished to give at the same time a preparation of iron, he might prescribe with one of the former salts, either citrate or ammonio-citrate of iron in any proportion to suit a particular case.

It must be remarked yet, that 16 grains of citrate of iron are not wholly soluble in one fluid ounce of alcohol of .877, not even with the addition of some free citric acid; and when a concentrated aqueous solution of this salt containing the amount stated is added to a fluid ounce of such alcohol, a precipitate is gradually deposited.

Philadelphia, May, 1861.

ON THE ERGOT OF INDIAN CORN (ZEA MAYS.)

BY CHARLES H. CRESSLER.

(An Inaugural Essay.)

The diseased grain, or as it is technically called, the smut of our common Indian corn, has been so universally considered, as its unsightly appearance would seem to indicate, a worthless if not a poisonous excrescence in the place of the golden grain, that an examination of its chemical and physiological properties might well be considered by those unacquainted with pharmaceutical research, a useless task; although to one whose studies have included the natural history of the ergot and gall-nut, and who judges of medicine, not by its origin, but solely by its therapeutical virtue, the analysis of no untried substance would appear valueless.

It was my intention to have included in this paper the results of a few trials with this substance in its medical relations, but being unfortunately disappointed in this, I was compelled to confine myself solely to a proximate analysis.

In view of the recent introduction of chloride of propylamin as a remedy for rheumatism, this subject may prove worthy of investigation as a source of that valuable salt, my experiments proving, I think, only less conclusively than an ultimate analysis, the existence of that alkaloid in the fungus of *Zea mays*. And judging from the exact similarity, in sensible properties, of its preparations to those of the ergot of rye, I think it might, at least, be supposed to be possessed of similar therapeutical virtues.

A quantity of the carefully selected grains were rubbed between the hands until the fine fungous matter was broken loose from the husk or envelope, and then sifted to separate the fine powder.

Eight ounces (troy) of this powder was moistened with a mixture of six parts by measure of 95 per cent. alcohol, and one part of washed ether, and allowed to stand for 12 hours; then transferred to a percolator and displaced with the same menstruum until the liquor came through nearly colorless; the mass was then expressed, moistened with pure ether and again expressed. The ethereal solution filtered and evaporated yielded but a faint trace of a light yellow colored resinous body in the form

of flakes, which left a greasy stain when pressed between folds of paper.

The liquid obtained by displacement which was of a dark brownish color, and neutral to test paper, was concentrated by distillation with a gentle heat to 10 fluid drachms. A portion of the distillate coming over last being free from ether, but having a strong odor of the ergot, was agitated with water, but no cloudiness was produced, thus showing the absence of any considerable amount of volatile oil. The liquid in the retort divided itself into two layers, a thick blackish oily substance settling to the bottom, the whole was agitated with a mixture of ether and water to cause complete separation; and on standing, the ether with the oily and resinous matter in solution floated on the surface, leaving the inferior layer almost colorless; the ethereal solution, decanted and allowed to evaporate spontaneously, yielded a mixture of oil and resin, which, by agitation with alcohol, was partially dissolved, a light, yellow colored resin, insoluble in that menstruum remaining. The alcoholic solution by evaporation yielded a thick, viscid oil, which, by standing, gave a deposit.

The mass, after drying, was returned to the percolator and displaced with water mixed with one-twelfth its bulk of alcohol, which was added to prevent fermentation; a deep reddish brown colored liquid was obtained, which was acid to litmus paper and produced effervescence when poured on crystals of bicarbonate of potash; this was concentrated by means of a sand bath to about 5 fluid ounces; 2 fluid drachms of this were put into a 2 oz. vial with 5 drops of liquor potassæ, and a piece of litmus paper, previously reddened by vapor of chlorohydric acid inserted and kept suspended above the surface of the liquid by the cork, had the blue color rapidly restored, thus showing the presence of a volatile alkaline substance and its ready elimination. Another portion agitated with a few drops of liquor potassæ, gave a strong odor similar to that of fluid-extract of *secale cornutum*, after the addition of liquor potassæ, and dense cloudiness was produced upon the presentation of a glass rod wet with chlorohydric acid.

Four fluid ounces of this concentrated solution was now put into a retort, and a receiver attached with a small wide-necked

vial filled to the top with chlorohydric acid suspended in it. Some liquor potassæ was then added and stirred in the retort, and a gentle heat applied; dense cloudiness very soon appeared at the mouth of the connecting tube, and soon filled the whole receiver. The vessel was then surrounded with snow, and kept refrigerated during the remainder of the process, which was conducted about three hours, when the fumes being less copiously formed, the receiver was detached and its contents evaporated in a small capsule by means of a water bath, until no more vapor appeared to rise from it, then allowed to cool; a group of crystals having a slightly yellowish tinge was obtained. These were soluble in water and alcohol, but insoluble in ether, and after being exposed to a gentle heat for some time and recrystallized from alcohol, had no perceptible odor of the uncombined alkaloid. But by touching a crystal with a drop of liquor potassæ to set free the alkaloid, the disagreeable fishy odor of propylamin was immediately developed.

The liquor remaining in the retort by evaporation gave a soft extract of a dark color, which had, beside the alkaline, a very sweet saccharine taste.

A portion of the aqueous solution was precipitated with subacetate of lead, the excess of lead removed by sulphuretted hydrogen, this left a colorless solution. It was evaporated to a thick syrupy consistence and allowed to stand. Some small groups of needle-shaped crystals were formed throughout the extract. This syrupy substance tasted quite as sweet as cane sugar, gave a precipitate upon the addition of subacetate of lead with ammonia, and did not readily reduce the oxide of copper when heated with a solution of the sulphate and caustic potash. This subjected to a temperature of about 120° F. for 48 hours and permitted to stand for two weeks exposed to the air, acquired a darker color, and upon being redissolved in water, gave a dense precipitate under the combined influence of subacetate of lead and ammonia, and promptly afforded the red dinoxide of copper under the influence of Trommer's test. 2nd, Four ounces troy of the fine powder treated first with washed ether gave a light yellow colored liquid, which yielded by spontaneous evaporation, a yellow resin, with small drops of a brown fixed oil deposited over the surface. The mass then treated with 95 per cent.

alcohol, and the solution evaporated gave a soft resinous extract; this by being stirred up with a dilute solution of potassa had the odor of the alkaloid, as eliminated from the aqueous solution, strongly developed, and dense cloudiness was produced by the presence of chlorohydric acid. The same actions occurred with the resin obtained by ether, but very faintly. The mass was then treated with water mixed with one-twelfth its bulk of alcohol, and the action upon the resulting liquor, of the several reagents applied, were as follows, viz.: Lime water added and gently heated gave a brown gelatinous precipitate, leaving the solution colorless, the precipitate was redissolved by the addition of chlorohydric acid, the solution again acquiring the former color. Neutral acetate of lead gave a similar precipitate, which was redissolved by the addition of nitric acid; liquor potassæ also gave a precipitate but did not deprive the solution of its color, caused no precipitate when added to solution of gelatine, and was not colored by tincture of sesquichloride of iron.

The mass was then boiled in 2 pints of water for half an hour and strained; a liquid of a sweetish taste, but having very little color, was obtained, which, after cooling, was effected by the tests applied as follows, viz.: Did not give a blue color with tincture of iodine, nor a perceptible reddish brown, but deep blue with recently prepared tincture of guaiac, and was not affected by freshly prepared solution of tannic acid, nor by solution of bichloride of mercury.

The results of my experiments enable me to make the following deductions: That this substance contains secalin, combined with an acid, a thick viscid fixed oil which throws down a large deposit by standing, a light yellow resin soluble in ether, but insoluble in alcohol, a large amount of pectin, gluten, and a sugar which crystallizes in tufts of needle-shaped crystals, from an aqueous solution, and behaves like cane sugar under the influence of Trommer's test.

NOTES ON MINERAL WATER SYRUPS.

BY JAMES T. SHINN.

The agreeability of carbonic acid water as a beverage depends principally upon its coldness, and the quality of the syrup with

which it is mixed. It is proposed to give in this paper the results of some experience in the preparation of the latter.

Grape Syrup.—In the autumn of 1860, a small quantity of Isabella grapes was treated in the following manner, the juice being obtained by means of an ordinary screw-press:

No. 1.—The fresh juice made immediately into syrup with 2 lbs av. sugar to a pint.

No. 2.—Fresh juice mixed with sulphite of lime in proportion of half a drachm to a pint, and bottled.

No. 3.—Two ounces of alcohol added to a pint of fresh juice.

No. 4.—A pint of juice with half a pound of white sugar, left in a warm place 24 days, filtered and bottled.

No. 5.—Half a pound of marc macerated in a pint of water and four ounces of alcohol.

No. 6.—Half a pound of marc allowed to stand for four days with two ounces of sugar in a pint of water.

All were tightly corked. Nos. 1 and 2 kept in the cellar all winter at a low temperature, the others in the laboratory at about 70°.

On opening the bottles this summer, the contents appeared to have undergone little or no change. No. 1, the syrup made immediately after expressing the juice, had rather a flat taste, and but slight odor of the grape. No. 2 had deposited the coloring matter with the lime, leaving a white, clear, supernatant liquid; fermentation was entirely prevented, and a peculiar, rather agreeable fruity odor developed. This article seems identical with one sold in this city last year under the name of "Pure Catawba Grape Juice," and which made a very pleasant syrup. No. 3 kept perfectly well, depositing a sediment easily filtered out. No. 4, having undergone some fermentation, had a vinous odor and taste, the bouquet having been slightly developed. No. 5, the alcoholic tincture of the marc was a very dark colored liquid, with a slight odor of the grape. No. 6 was somewhat acid, with a pleasant vinous odor.

When made into syrups, just bringing them to a boil, the nicety of the result may be stated in the following order, beginning with the best and ending with the least agreeable; No. 6, 4, 2, 1, 3, 5. We have mixed them all together, producing quite a popular "Grape Syrup."

Judging from these experiments, the best plan probably will be to crush the grapes, allow juice and marc to ferment together for four or five days, express the juice, add two pounds of sugar to a pint, boil three minutes, strain and bottle. Catawba grapes might yield a pleasanter syrup than Isabella, and if at 12 cts. per pound, the juice would cost about \$1.50 a gallon, nearly one-third the price of the article above alluded to.

Strawberry Syrup.—The most satisfactory method of making this syrup is to allow the expressed juice to stand 48 hours in warm weather, by which time fermentation ensues and the liquid can be strained off quite clear. The strawberry flavor is rather improved than impaired by this process, and the syrup is much brighter and does not ferment in the bottle as is often the case when made in the old style. On one occasion when the juice was left for 60 hours, the pectin coagulated, owing to the amount of alcohol generated, and gave considerable trouble in straining.

Last summer a quart of fresh juice was bottled with one drachm of sulphite of lime and kept in the cellar all winter. On examining it a few days ago it was a very clear light-colored liquid with a sediment in the bottom of sulphite of lime and coloring matter. The strawberry flavor was perfectly preserved, no fermentation had taken place, and when filtered and made into syrup it was pronounced to be a very superior article. This plan is a good one for those who do not wish to keep a quantity of sugar on hand made into syrup. The objections may be the necessity of filtering and coloring the syrup.

Orange Syrup.—To obtain the orange flavor, the fresh rind should be chopped fine and macerated in deodorised alcohol in proportion of one pound to a quart. Citric acid is remarkably soluble in alcohol, and by dissolving four ounces in a pint of the essence, an article is obtained which keeps unchanged for months, and affords an easy mode of making the syrup. Two fluid ounces added to a gallon of simple syrup yields an unexceptionable orange syrup.

Simple Syrup.—As the basis of vanilla, orange, lemon, ginger, &c., is most conveniently made by introducing through the bung-hole of a 40 gallon barrel, 240 pounds of refined "sifted sugar," and 15 gallons of water, replacing the bung and rolling the barrel occasionally for two or three days. The sugar easily

dissolves without the trouble of heating, yielding a clear syrup which keeps perfectly well and may be drawn off through a "molasses gate," as wanted.

Philadelphia, Sixth month 11th, 1861.

GLEANINGS FROM THE GERMAN JOURNALS.

BY JNO. M. MAISCH,

A Solution of Starch for volumetric analysis is prepared by Dr. F. Mohr, by trituration, with concentrated chloride of zinc, and diluting with water; the solution is not clear, but after precipitating the zinc by carbonate of soda, the filtrate is transparent.—(Ann. d. Ch. and Ph. xxxix. 211–213.)

Oenanthic Acid.—A. Fischer, operating in Fresenius' laboratory, states that the oenanthic acid of wine of fusel oil is a mixture of volatile fatty acids, among which are caprinic and caprylic acid.—(Ann. d. Ch. and Ph. xxxix. 247.)

Phospho-molybdic Acid.—Prof. de Vrij claims priority for discovering this test for alkaloids in 1853, as will be seen from Journal de Pharm. et de Chim. xxvi. 219.—(Ann. d. Ch. and Ph. xxxix. 248.)

Gun-cotton, kept in a glass-stoppered bottle, since 1847, had been decomposed, according to A. W. Hofmann, into gum and oxalic acid.—(Ann. d. Ch. and Ph. xxxix. 282.)

The separation of Cadmium from Copper may, according to A. W. Hofmann, be effected by treating their sulphides with boiling dilute sulphuric acid, (1 p. acid, 5 p. water,) which readily dissolves the sulphide of cadmium, without acting on the copper sulphide.—(Ann. d. Ch. and Ph. xxxix. 286.)

Reactions of Cholesterine, by Hugo Schiff.—Cholesterine and nitric acid, evaporated to dryness at a moderate heat, yield a yellow residue, turning deep red with ammonia; the color is not altered by fixed alkalis,—difference from the similar reaction of uric acid. Cholesterine evaporated with muriatic or sulphuric acid, containing sesquichloride of iron, leaves a residue of a beautiful violet color. Auric and platinic chlorides may be

substituted for sesquichloride of iron.—(Ann. d. Ch. and Ph., xxxix. 313–318.)

Examination of Shellac.—A. Oberdörffer exhausts shellac by cold ether, which takes up only the 5 per cent. wax contained therein. Adulterations with rosin and similar resins, soluble in cold ether, are thus easily detected.—(Archiv d. Pharm. ciii. 13, 14.)

Blue Milk.—Dr. E. Reichardt, in examining a blue cream, corroborates Braconnot's statements, that water, alcohol, ether and cold dilute acids and alkalis are without influence on the color, which is destroyed by nitric acid, chlorine and boiling with potassa. Neither phosphate of iron, nor infusoria were the cause of the coloration; it was evidently due to a mould which was examined by the microscope, but the author leaves it undecided whether the fungus was *Byssus coerulea*, Lam.—(Arch. d. Ph. ciii. 25–29.)

Greek Tobacco yields a smoke which is free of sulphuretted hydrogen and hydrocyanic acid. Landerer employed the same method as Professor Vogler, (Amer. Jour. Ph. 1859, 76.) The empyreumatic liquid separating in pipes, is popularly employed in exanthematous complaints, and its use has frequently proved fatal.—(Arch. d. Ph. ciii. 29–33.)

Glonoine or Nitroglycerine is obtained without difficulty, according to J. P. Liebe, if $\frac{1}{2}$ oz. anhydrous glycerine spec. grav. 1.273 is added with constant agitation to a mixture of 2 oz. sulphuric and 1 oz. fuming nitric acid, spec. grav. 1.52, with the precaution to keep the temperature below 25° C. (77° F.) After one minute it is poured in a thin stream into 50 oz. cold water, which is afterwards decanted, while the glonoine is collected upon a moistened filter, washed with water, and subsequently moderately heated until transparent. If the wash water is repeatedly used, the yield is 5 drachms 5 to 10 grs. It is a light yellowish liquid, spec. grav. 1.5958, and acquires after several weeks an odor of nitrous ether.—(Arch. d. Ph. ciii. 158–160.)

Glonoine kept at ordinary temperature, occasionally evolves nitrous acid and deposits crystals of oxalic acid. This may be

prevented by keeping it under water, or by diluting it.—(Arch. d. Ph. civ. 282, 283.)

To prevent the moulding of Plasters containing vegetable powders, A. Hirschberg recommends to heat the ingredients of the plaster in a steam bath until free of moisture, then add the well dried powder, and employ in spreading anhydrous oils. The plasters are harder than as ordinarily made, a slight increase of oil is therefore advisable.—(Arch. d. Ph. ciii. 165, 166.)

Arsenical Wall-colors and Papers.—C. Fabian, of Augsburg, reports the chemical examination of urine of two patients, sleeping in rooms, the walls of which were covered with paper, colored by Schweinfurt green; both urines contained arsenic, but no copper. The physician, Dr. Müller, ordered the removal of the paper, and gave iodide of potassium, when the arsenic at first increased in quantity in the urine, and finally disappeared. F. collected the dust from two rooms hung with arsenical paper, and of two rooms washed with colors containing Schweinfurt green, and proved the presence of arsenic and copper. He advises to discard all wall colors and papers containing this poisonous metal.—(Archiv d. Ph. ciii. 257–270.)

Professor Wittstein calls attention to the circumstance that rooms washed or papered with arsenical colors, frequently have an alliaceous odor, which he thinks is due to the elimination of metallic arsenic by lime: $5 \text{AsO}_3 = 3 \text{AsO}_5 + 2 \text{As}$. When no lime is present, the reduction must be ascribed to the organic matter, glue, gum, &c., in the presence of atmospherical moisture. Minute quantities of arsenic will fill a room with the garlicky odor.—(Arch. d. Ph. civ. 36–42.)

Titration of Burned Lime for ascertaining the amount of Caustic Lime.—2.80 grms. burned lime from different parts of the whole pile, are slacked and well mixed. 1-10th part of it is mixed with water and 50 to 60 grm. chloride of ammonium, so that the whole measures 1000 c. c. m. After agitation and settling, 10 c. c. m. of the clear liquid are estimated with normal oxalic acid. The results are sufficiently accurate for all technical purposes, a slight excess being found, because the liquid

measures 1000 c. c. m. less the bulk of the insoluble clay and carbonate of lime.—(Arch. d. Ph. ciii. 270–272.)

Titration of Lye for Carbonic Acid.—Dr. Gräger takes 10 c. c. m. of lye of known amount of alkali, adds an equivalent amount of chloride of ammonium, then an equivalent of chloride of calcium; after settling, a portion of the clear liquid is measured with oxalic acid. Less alkali will now be found if carbonic acid was present; the difference is carbonate.—(Arch. d. Ph. civ. 18, 19.)

Adhesive Plaster is occasionally obtained very soft, which Feldhaus thinks is due to the formation of acid oleates, &c. which do not decompose the carbonate of lead, present in litharge. Such a plaster can be made use of by the addition of a little plaster prepared from lard. If the oil should contain too little stearine and palmitine, an addition of lard, in no case exceeding 10 per cent., will yield a plaster of proper consistence.—(Arch. d. Ph. civ. 29–33.)

Adulteration of Liquorice.—H. J. Versmann met with a Sicily liquorice, adulterated with the extract of the root of *Triticum repens*, Linn., *Extractum graminis* of the German Pharmacopœias.—(Arch. d. Ph. civ. 34.)

No Iodine in Sarsaparilla Root.—The same author examined Honduras Sarsaparilla for Iodine without finding a trace; still he thinks it possible that under peculiar circumstances the root may contain it, as has been asserted by Guilliermond.—(Arch. d. Ph. civ. 35.)

Permanganic Acid.—Hermann Aschoff has made a number of analyses in Prof. Mitscherlich's laboratory, and disproves the assertion of T. L. Phipson, that permanganate of potassa was $\text{KO}, 2\text{MnO}_3$. He found Mn 49.76, O 50.39; the formula Mn_2O_7 requires 49.61 and 50.39 respectively. On condensing the greenish brown gas, resulting from the reaction of SO_3 , NaCl and KO, MnO_7 , some oily drops were obtained, which agreed in composition with the formula Mn_2ClO_6 , but the author is inclined to regard it rather as a solution of MnCl_7 in MnO_7 .—(Arch. d. Ph. civ. 141–157.)

Detection of Phosphorus.—The phosphorus globules obtained in Mitscherlich's apparatus, contain, according to W. Dankworth, also sulphide of phosphorus, if the original mass was contaminated with sulphur.—(Arch. d. Ph. civ. 168, 169.)

Gun Cotton for Collodium.—The Archiv der Pharmacie, civ. 270–275, reports on the results of experiments with saltpetre and sulphuric acid, from which the following process is deduced: 1 oz. cotton—from a larger quantity, a less good product is obtained—is introduced into a mixture of 16 oz. saltpetre, 12 oz. English, and 12 oz. Nordhausen oil of vitriol of 55 to 56° R. (156 to 158°F), and continually stirred for 5 minutes; the whole is then thrown in much warm water, and finally well washed. The yield is about 120 per cent. and the cotton readily soluble in ether.

Titration of Alumina in Alum.—1.717 grm. alum are dissolved in water, 2 grm. chloride of barium are added, and the titration carried out with potassa in the presence of litmus; each cubic centimetre corresponds with 1 per cent. alumina. Or 7.927 grm. alum and 10 grm. chloride of barium are employed when each c. c. m. potassa indicates 2 per cent. alum.—(Archiv d. Ph. civ. 275–278.)

Tin and Terchloride of Gold.—Dr. Witting, sen., found that terchloride of gold in 11.520 parts water rapidly assumes a purple color in contact with pure tin filings. With $\frac{3}{8}$ lead, the tin reacted slower in 6000 water; tin with copper similar in 8000 water, but instantly in the presence of electricity, if the filings were contained in spirally wound copper and silver wire.—(Arch. d. Ph. civ. 279.)

Bitter Yeast.—C. L. Lüdersen removes the bitter taste of 30 parts of yeast, by macerating it with a solution of 1 p. carbonate of soda in 240 p. water, and washing with water; an increase of soda is apt to produce in the bread a peculiar, though not unpleasant odor.—(Arch. d. Ph. civ. 280, 281.)

Perochromic Acid.—The blue compound resulting from mixing very dilute solutions of bichromate of potassa and binoxide of hydrogen with free acid, was dissolved by H. Aschoff in ether.

By titration he studied its oxidizing power on a proto-salt of iron directly, and in the presence of potassa, and found the used oxygen in both cases in the proportion 4: 3, from which he concludes the existence of a very unstable perchromic acid = Cr_2O_7 . If the chromate of chromic oxide Cr_2O_3 , CrO_3 is viewed as a binoxide = CrO_2 , the oxides of chromium correspond with those of manganese.—(Archiv d. Ph. civ. 129–140.)

Oxidation of Protosalts of Iron.—In publishing his observations on the preparation of acetate of iron, Zippel recommends to expose the protochloride of iron with water and muriatic acid for several weeks to the air, diluting, heating and adding chlorate of potassa, and when necessary, muriatic acid; the solution is then precipitated by ammonia in order to gain the sesquioxide.—(Arch. d. Ph. civ. 156–159.)

The yellow color of a decoction of Marsh Mallow Root is due, according to Gust. Selle, to a decomposition of its constituents when not kept perfectly dry, and to the consequent presence of ammonia, probably from asparagin.—(Arch. d. Ph. civ. 160.)

Oleum Morrhue ferratum.—15 parts protosulphate of iron are precipitated by 14 p. carbonate of soda, the precipitate expressed, and after the addition of little water digested for $2\frac{1}{2}$ hours in a water bath, with 250 parts cod liver oil. The deep brown mixture readily becomes clear in a bottle, and soon thickens on exposure to the air. The oil is said to contain about 1 per cent. of iron.—(Arch. d. Ph. civ. 270, 271.)

Emplastrum Plumbi.—W. Lienau rubs the litharge with oil to a thin paste, which is heated to 80°C (176°F). When the remainder of the oil has been heated to 90°C (194°F), the litharge is added. After stirring continually for $\frac{1}{4}$ or $\frac{1}{2}$ hour, little hot water is added, and the supply kept up as it evaporates. With a well regulated heat, the plaster is finished in 8 or 10 hours, and a good glycerine is obtained.—(Arch. d. Ph. civ. 274.)

Pure Carbonate of Soda is prepared by W. Lienau from crude soda by dissolving it in distilled water, diluting with 6 or 8 times the quantity, and precipitating lead and iron by a current of sulphuretted hydrogen. The sulphide of sodium is decom-

posed in contact with oxide of iron, a little bicarbonate of soda is added to neutralize some caustic soda, and the filtrate is evaporated and allowed to crystallize, so long as pure crystals are formed.—(Arch. d. Ph. civ. 271, 272.)

Purification of Silver.—Lazar Berlandt dissolves the silver in nitric acid, evaporates to dryness, redissolves in water, and precipitates by protosulphate of iron. The whitish grey precipitate is after some hours washed with water, acidulated with muriatic acid, finally with distilled water.—(Arch d. Ph. civ. 279, 280.)

Iron reduced by Galvanism.—Daniell's battery reduces iron from a solution of its protochloride as a lead grey deposit, which is very spongy if the evolution of hydrogen is strong; it is then a rather light powder, very soft, extremely ductile, so that it may be converted into plates between the finger nails, and might probably be useful for medical purposes, as it yields with acids a perfectly inodorous hydrogen.

From a solution of the chloride with $\frac{1}{2}$ chloride of ammonium a silvery deposit is obtained under the same circumstances, which is hard like steel, brittle like glass, and becomes ductile by a red heat. It oxidizes readily in moist air, but retains its lustre in dry air. Some chemists supposed it to be a modification of iron, but with soda-lime it evolves ammonia and consists of 98.51 Fe and 1.49 N.—(H. Krämer in Arch. d. Ph. civ. 284-286.)

Mannite in Scorzonera hispanica, Linn.—Dr. Witting isolated from the root of this plant mannite.—(Arch. d. Ph. civ. 286.)

Solubility of Starch.—In an address delivered before the Swiss Apothecaries' Association, Dr. Flückinger proved that starch is soluble in cold water after the hulls have been torn. A solution containing $\frac{1}{2}$ to $\frac{1}{3}$ chloride of calcium, dissolves the starch, and may, after dilution with 100 to 150 parts of water, be filtered. The filtrate is precipitated by alcohol; the precipitate dries to colorless translucent pieces, containing about 10 per cent. of hygroscopic water, and, after drying over sulphuric acid, of a spec. grav.=1.475. While still moist, the precipitate is soluble in warm water; after drying, boiling water dissolves but traces, chloride of calcium does not increase its solu-

bility, and in Schweizer's ammoniated copper it merely swells up; it has become insoluble. The hulls of starch prevent the amylogene of Delffs from passing into the insoluble modification.—(Schweiz. Zeitschr. f. Ph. v. 185–191.)

GLEANINGS FROM THE FRENCH JOURNALS.

BY THE EDITOR.

Percolation under strong pressure.—M. Signoret, Pharmacien of Paris, has suggested an apparatus for extraction, in which it is proposed to hasten the process of percolation, by employing the force of compressed air upon the surface of the liquid in the percolator. The apparatus consists of a reservoir of metal for the compressed air, of such strength as to resist from two to eight atmospheres, according to the force desired. Attached to this is a forcing pump, worked by a lever. On four opposite points, in the sides of the reservoir, are placed four stop-cocks, with coupling screws, for attaching tubes connecting the reservoir with the tops of four percolators.

In employing the apparatus, the material in powder is put in the percolator, perhaps previously moistened, and the menstruum poured upon it, and then the pressure of the reservoir brought to bear upon its surface. M. Signoret believes that by this mode and arrangement, substances are more thoroughly and quickly exhausted than by maceration or ordinary displacement. Even flour of mustard, mixed with an equal bulk of sand, can be exhausted. Wine of cinchona was made in twenty minutes before a committee, who examined the apparatus. The price is quoted as from 200 to 300 francs, according to whether one or four percolators are attached to the reservoir.—*Répertoire de Pharmacie, Mars, 1861.*

Varnish to prevent rust in iron and steel.—M. A. Vogel suggests that the oxidation of steel and iron instruments is very perfectly prevented by coating them with a varnish made by dissolving one part of White Wax in 15 parts of Benzin, and applying it by means of a brush. The very thin layer of wax forms a perfect covering for bright instruments, and when needed is easily removed.—*Répertoire de Pharm.*

On Wadding from Asclepias Syriaca, by M. Basiner.—It has been frequently suggested that the silky appendage of the seed of this plant should be utilized by association with silk, linen or cotton, but heretofore the results have not proved to be important. Recently, MM. Piroshkoff and Hartmann, (of Kiew,) have employed the fibres of the liber of the same plant by a peculiar process, so as to resemble closely the cotton fibre, and they propose to cultivate it on a large scale. M. Basiner made a comparative microscopic examination of the silky fibres of *Asclepias* and those of cotton, and finds them very analogous in their structure, but says they can be distinguished under the microscope by the disintegrating action of the ammoniacal oxide of copper of Schweizer, which is more apparent on the layers of cotton than on those of the former.—*Répertoire de Pharm.*

Glycerole of Chlorate of Potassa, by M. Martinet.

Take of Chlorate of Potassa, 10 grammes.

Pure Glycerin 100 grammes.

Dissolve the salt in the glycerin. This mixture possesses disinfectant properties very marked.

Another advantage of this glycerole is that of removing the portions of dressing adherent to the sides of wounds. M. Martinet asserts that the glycerole of chlorate of potassa does not excite or redden old sores or recent wounds.

It has been stated that about one-tenth of the chlorate remains undissolved.—*Jour. de Chim. Méd.*, June, 1861.

Glycerole of Oil of Mustard, by M. Grimault.

Take of Pure Glycerin, 13 drachms.

Starch, 20 drachms.

Volatile oil of Mustard 80 drops.

Mix them.

This preparation affords a sinapism always ready for use. [The high price of the volatile oil is an obstacle to the general use of this recipe, yet for travellers liable to need this remedy, it is an elegant and convenient form of applying mustard.]—*Jour. de Chim. Méd.*, June, 1861.

Syrup of Santonin.—The frequent employment of santonin

in medicine as a vermifuge suggested to M. Lafargue, pharmacien at Moissac, the idea of preparing a syrup, as follows :

Take of Santonin 55 grains.

Simple Syrup, 16 ounces, (Troy.)

Alcohol, q. s.

Dissolve the santonin in a little alcohol and add the solution to the syrup boiling hot. Each tablespoonful contains about three grains of santonin.

ON ANACAHUITE WOOD.

BY PROF. A. BUCHNER.

If we were to judge of its efficacy from the taste of a remedy, we would suppose that this wood has little or no remedial properties ; it is nearly tasteless, except the bark, which is faintly astringent. Cold water extracts but little from the bark and still less from the wood. The brownish infusion does not red-dens litmus paper ; sesquichloride of iron is colored dirty green, gradually changing to brown, indicating little tannin. Other reagents did not produce any characteristic reaction. On evaporation very little extract was left, which besides the faint astringent taste, showed nothing characteristic.

Boiling water extracted little from the bark and wood, previously exhausted by cold water ; no starch was indicated by iodine, though Prof. Radlkofer found under the microscope some few starch granules in the pith rays ; but a considerable sediment of oxalate of lime was deposited.

Alcohol dissolved little from the original bark ; the tincture was light yellowish, turning deeper yellow, somewhat greenish with ferric chloride. On evaporation, little brownish yellow extract was left, of which the smallest portion dissolved in water, which solution contained some tannin ; the residue was indifferent in taste, became soft and pliable in warm water, and behaved like resin. Ether took up very little from the bark ; the scarcely colored liquid left a very small yellowish residue of a resinous nature.

The wood freed from bark has lately been carefully analyzed by Dr. Ziurek, of Berlin, (Pharm. Centralhalle, ii. No. 36,) with-

out finding anything of importance. He found it free from glucosides, neutral crystalline bodies, alkaloids, chromogenes, amides and volatile oil, and obtained from 1000 grammes 5.12 grm. dry ethereal, 41.34 alcoholic and 52.00 aqueous extract, or 5.01 grm. resin, 16.93 gum, 3.11 gallic acid, 52.34 tannin, 21.17 bitter extractive, 758.34 lignin, and 143.10 water and loss.

1000 grms. wood yielded 18.05 grms. ashes, composed of .92 chloride of sodium, 2.02 sulphate of potassa, 88.50 carbonate of lime, 2.71 carbonate of magnesia, 3.02 ferric oxide with traces of phosphoric acid and 2.04 silicic acid.

What appears to me to be worthy of attention in this new drug, is the large quantity of oxalate of lime, which is present in the form of a very fine powder, apparently in the same condition as obtained from the solution of a lime salt by oxalic acid or an oxalate. Dr. Otto Berg, of Berlin, remarked, what has been corroborated by Prof. Radlkofer, that the parenchyma and the medullary rays owed their characteristic reddish white color to a crystalline powder, filling the parenchymous cells; on tearing them, thin lamellæ are obtained covered with a fine roughish powder, causing considerable dust.

Several experiments prove that this powder is pure oxalate of lime; it is best separated by pouring ether on the bruised bast, and agitating, when the powder will remain suspended in it for a longer time than the cells, and finally be deposited from the liquid after straining through linen. It is dissolved by muriatic acid, and may likewise be extracted by it from the bark. Chloride of barium causes no turbidity in this solution, ammonia produces a pulverulent precipitate insoluble in acetic acid; the same precipitate appeared on adding acetate of potassa.

On account of this compound, the bast leaves on incineration a large quantity of white ashes, retaining, like tobacco ashes, the original form of the bast, and consisting of carbonate of lime. The dried wood leaves but 2.93 per cent. ashes, while the parenchyma yields about 20 per cent. containing 18.90 carbonate of lime, equivalent to 24.19 oxalate of lime, or about $\frac{1}{4}$ of its weight.

Such a large quantity of oxalate of lime can scarcely be found in another plant of so high organization. Might it

not be the cause of the medicinal properties of this wood, and act as a preservative to the lungs by combining with oxygen and yielding carbonic acid and carbonate of lime? Therapeutic experiments with pure oxalate of lime could best solve this question.

The salt is insoluble in water, but its fine particles readily pass through the strainer with the decoction, and remain suspended therein for some time. To its presence must be ascribed the sensation of dryness in the throat, observed by the patients taking this decoction. To prevent it, the addition of a mucilaginous liquid might be advisable, like mucilage of gum arabic, some Irish moss or Iceland moss, deprived of its bitter principle.

It is stated that a false anacahuite has made its appearance in commerce; the crystalline powder in the parenchymous cells may be the best means of proving its genuineness.—*Buehn. N. Repert.* x. 97-103.

J. M. M.

ON COCA OR FOLHA SAGRADA—ERYTHROXYLON COCA.

Th. Peckolt reports in *Archiv der Pharmacie*, ciii. 39-42, on the following paper of Dr. Valdez:

Coca is the leaf of a shrub, growing to the height of not over six feet, and cultivated almost exclusively in Peru and Bolivia, recently also in the Brazilian province of Alto Amazonas. At the time of discovery the plant was used only by the Incas and the royal family, and looked upon as the image of a deity. Nobody entered the enclosure or sanctuary where it was cultivated, without previously kneeling down as a sign of adoration. Sacrifices were believed not to be acceptable unless crowned with a twig of this shrub. Oracles would not answer, and their prophecies were terrible, if coca was not chewed on interrogating them. The Indian found consolation with this divine plant in all misfortunes and when praying for happiness.

Gradually its use extended to the whole population, and it became an important commercial article. Shortly before the independence from Spain, Peru produced coca valued at \$2,841,487 and the leaves circulated occasionally as money. The Indians, in using them, are thereby enabled to perform the hardest mining operations in the midst of deadly metallic exhalations, with-

out resting and without protection against the unfavorable influences of climate. They march hundreds of miles through deserts and over steep mountains, subsisting solely on coca, and frequently carry burdens over places impassable for beasts of burden. Some travellers ascribe this astonishing frugality and abstinence from food to the effect of habit, without remembering that the Indians are naturally very voracious, and lose their strength when abstaining from chewing the leaves.

Coca leaves have a faint and agreeably aromatic odor, particularly when chewed; their taste is somewhat bitter and astringent, and colors the saliva green. They are strengthening, giving tone to the stomach, and are employed against intermittents, though with less decided results than cinchona. They are mixed with lime prepared from certain plants, and used like betel in the Indies. With it and a handful of roasted corn, (maize), an Indian travels a hundred miles afoot, keeping pace with a travelling horse. Travels in the Andes are undertaken with an Indian, and it happens on hot days, that the horse is fatigued before the Indian.*

It is a narrow leaf, little over an inch in length; there are two species, one 2, the other $1\frac{1}{2}$ inches in diameter, (length?). The former is called *cacha*, and is superior and more esteemed than the commoner one, which is used only in cases of need and by the poorest people.

The culture of this shrub is very troublesome, it being subject to the attacks of a little insect, which sometimes devastates a whole plantation in a single night. Three years after planting, the shrub commences to bear fruit. The harvest of coca, called *palla*, is very laborious, and usually left to women; they commence at dawn to collect the coca into little trunks, leaf by leaf, with the greatest care, so as not to break the stalks or otherwise injure them; a good workman fills ten such little trunks by night. The collected leaves are dried in the sun for two or three days with great care, so as not to become wet or moist, whereby they

*It has been variously proposed to supply emigrant and other ships with coca leaves, to be used as food in case of shipwreck and other accidents. Their introduction into the army and navy has likewise been advocated, and it is likely that they will be employed in some of the European armies, in order to test their efficacy in keeping up the strength and vigor of the men in urgent cases when food cannot be had.

would be entirely ruined. This procedure is called *seca*, the box containing the fresh leaves *gerga*, and the collectors *palhardoras*. The leaves are afterwards packed in bags of 1 arroba, (= 32 lb.) and sent to the cities, among which Cusco receives the largest cargoes; from here all the departments of Peru and Bolivia are supplied. But a few years ago, coca was cultivated scarcely outside of Valles de St. Anna; now there are plantations at Paz, Cochabamba and Alto-Peru, but the quality is inferior.

Coca drank as tea has the same aroma and taste as the finest pearl tea, without any stimulating qualities; from its numerous good properties, it promises to become an important commercial article of Peru and Bolivia.

J. M. M.

ON DAPHNINE.

BY CONST. ZWENGER.

Daphnine was first discovered by Vauquelin in the bark of *Daphne alpina*, afterwards by L. Gmelin and Baer in the bark of *Daphne mezereum*; but little is known of its properties and constitution.

Old mezereon bark yields little daphnine. The author employs the recent bark collected at the beginning of blooming; it is cut, bruised with alcohol into a fibrous mass, and digested with strong alcohol. The resulting tincture, containing but little foreign compounds, may be repeatedly employed for exhausting fresh bark. After the entire evaporation of alcohol, boiling water leaves a resinous mass of an acid nature, colored by chlorophyll and readily soluble in strong and weak alcohol. The cold aqueous solution is filtered, precipitated with acetate of lead, and the filtrate precipitated by subacetate of lead and boiled. The washed precipitate is decomposed by sulphuretted hydrogen and the aqueous filtrate evaporated to crystallize; if this solution should become too ropy, the addition of a little alcohol is advisable. The crystals are washed with diluted alcohol and recrystallized from water.

The acetate of lead precipitates a little daphnine, but removes substances which prevent the crystallization of daphnine. From

the aqueous liquid, freshly precipitated hydrated oxide of lead removes, on continued boiling, the daphnine; if this precipitate is decomposed by sulphuretted hydrogen, the filtrate evaporated and the residue redissolved in little boiling alcohol, daphnine will crystallize on spontaneous evaporation. The first process, however, is preferable.

In preparing the extr. mezerei æthereum of some Pharmacopœias, all the daphnine may be obtained from the residue, left by treating the alcoholic extract with ether.

Daphnine is insoluble in ether, little soluble in cold water, freely in hot water and alcohol, particularly in boiling alcohol; on cooling it separates in silky needles or in colorless rectangular prisms. It has an acid reaction, and a bitterish, astringent taste; at 100° C., (212° F.), it loses 9.3 per cent. water of crystallization, has, at a somewhat higher heat, a faint odor, reminding of coumarin, fuses at about 200° C., (392° F.), and is decomposed, finally giving off the odor of burning sugar. It is soluble in alkalis and their carbonates; the golden yellow solution becomes brown red by exposure and boiling. Its solution is not precipitated by acetate of lead, is colored and, on boiling, precipitated yellowish by subacetate of lead and by hydrated oxide of lead; nitrate of silver is reduced on boiling in the presence of ammonia; neutral sesquichloride of iron produces a bluish color, changing to yellow on boiling and separating, on cooling a deep yellow precipitate. No alteration occurs with protosalts of iron, and a slow reduction with alkaline oxide of copper; acetic acid dissolves daphnine unaltered; nitric acid colors it red, dissolves it and produces, on heating, oxalic acid. Its composition is $C_{62}H_{34}O_{38} + 8H_2O$.

Daphnine is decomposed into sugar and daphnetine by sulphuric and muriatic acid, by emulsin, by yeast in the presence of a little glucose, and by dry distillation. This product is a weak acid, slightly astringent, very soluble in boiling water and alcohol, little in ether, and crystallizes in colorless prisms. It is colored red by nitric acid, precipitated yellow by lime- and baryta water and by acetate and subacetate of lead; it reduces nitrate of silver and alkaline solutions of copper, and produces, with neutral persalts of iron, an intensely green color, disappearing by excess of the ferric salt and by free acid; ferrous

salts yield a faint green color only with an excess of daphnetine, which thus resembles aesculetine. Its composition is $= C_{38} H_{14} O_{18}$; its compound with lead $= C_{38} H_{10} Pb_4 O_{18}$.

On the dry distillation of the alcoholic extract of mezereon, the empyreumatic distillate separates crystals of daphnetine and umbelliferon, the latter of which is not precipitated by acetate of lead, crystallizes in colorless rhombic prisms, yields with water a colorless solution, which appears beautiful blue in reflected light and sublimates below its fusing point $= 240^{\circ} C.$, ($464^{\circ} F.$) While it is remarkable that Dr. Sommer could not obtain umbelliferon from ammoniac, a gum resin of an umbelliferous plant, it is not less remarkable that *Daphne mezereum*, a plant not allied to the umbelliferæ, yields this product of decomposition. —*Ann. d. Ch. and Ph.* xxxix. 1—18. J. M. M.

PROCESS FOR OBTAINING THE SOLUTION OF PERCHLORIDE OF IRON NEUTRAL AND UNALTERABLE.

By M. ADRIAN.

The following process has been communicated by M. Adrian to the Academy of Medicine, for obtaining the officinal (Paris Codex) solution of perchloride of iron neutral and permanent :

“This process, which I have long used in my store for making neutral solution of perchloride of iron, is very simple. It consists in preparing, by means of chlorohydric acid of the usual Paris strength, a solution of proto-chloride of iron marking 25° Baumé. To avoid all peroxidation of the iron by the air, this preparation is put immediately into a series of Woolf’s bottles, into which a rapid current of chlorine (previously well washed) is passed during about five or six hours. This time suffices usually to convert all the protochloride into sesquichloride in the first bottles which receive the gas. The last bottles, which are not saturated, are then put in place of the first and these filled with a new portion of the protochloride, if it is desired to render the operation continuous. The solution of perchloride of iron is now thrown into a porcelain capsule and heated to a temperature not exceeding $122^{\circ} F.$ during an hour. The operation is finished by passing into the liquor a current of air which re-

moves the last traces of chlorine. The solution obtained marks 29° to 32° B., and is brought to the officinal strength (30° Baumé) by evaporation or dilution, as the case may require.

The perchloride of iron obtained by this process is chemically neutral, as the following analysis proved, and the solution after being kept a long time had not undergone the least alteration, whilst the perchloride made by other processes had changed soon after its preparation.

The normal solution of perchloride of iron, chemically neutral, is perfectly limpid without its having been filtered; it yields no ochreous deposit on standing, and its color is saffron yellow. It produces an excessive astringence without the acidity observed in all other solutions of perchloride of iron. At 30° Baumé it contains, in 100 parts, water 74, anhydrous perchloride of iron 26 parts.

The mean of three analyses of this normal solution was

Oxide of iron, 12.80	{	Chlorine, 16.989	16.959
		Iron, 8.960	8.976

These results show the chemical neutrality of the product of the above formula."—*Repertoire de Pharmacie*, Jan., 1861.

ON THE PROPERTIES OF LIQUID CARBONIC ACID.

By GEORGE GORE, Esq.

In this communication the author shows how a small quantity of liquid carbonic acid may be readily and safely prepared in glass tubes closed by stoppers of gutta percha, and be brought in a pure state into contact with any solid substance upon which it may be desired to ascertain its chemical or solvent action, or be submitted to the action of electricity by means of wires introduced through the stoppers.

By immersing about fifty substances in the liquid acid for various periods of time, he has found that it is comparatively a chemically inert substance, and not deoxidised by any ordinary deoxidising agent except the alkali metals. Its solvent power is extremely limited. It dissolves camphor freely, iodine sparingly, and a few other bodies in small quantities. It does not dissolve oxygen salts, and it does not redden solid extract of

litmus. It penetrates gutta percha, dissolves out the dark brown coloring matter, and leaves the gutta percha undissolved, and much more white. It also acts in a singular and somewhat similar manner upon india rubber. The india rubber while in the liquid acid exhibits no change, but immediately on being taken out its wells to at least six or eight times its original dimensions, and then slowly contracts to its original volume, evidently from expansion and liberation of absorbed carbonic acid, and it is found to be perfectly white throughout its substance. These effects upon gutta percha and india rubber may prove useful for practical purposes.

The liquid acid is a strong insulator of electricity; sparks (from a Ruhmkorff's coil) which would pass readily through $\frac{9}{32}$ nds of an inch of cold air, would with difficulty pass through about $\frac{1}{70}$ th of an inch of the liquid acid.

In its general properties it is somewhat analogous to bisulphide of carbon, but it possesses much less solvent power over fatty substances.—*Chem. News, London, May 11, 1861, from Proceedings of the Royal Society.*

A NEW ACID BY THE OXIDATION OF NITRO-BENZINE.

When nitro-benzine is oxidised by boiling, either with a solution of permanganate of potash or a mixture of nitric acid and bichromate of potash, there is found among the products a peculiar acid. The oxidation is most conveniently effected by the last-mentioned means, but care must be taken to have an excess of nitro-benzine. The new acid is soluble in hot nitro-benzine, but separates on cooling in small white crystals, which remain suspended in the solvent. This is separated by decantation, is then shaken up with an excess of ammonia, which dissolves the new acid and another, forming a deep yellow salt much like picric acid in appearance. The solution is treated with hydrochloric acid, which causes the new acid to deposit. It is then washed with distilled water to remove chloride of ammonium and also some yellow acid which accompanies it. So purified, it has the following properties:—It is colorless, has a sharp, slightly bitter taste, and presents itself in slender needles irregularly grouped together. It fuses at a temperature

little above the ordinary, and completely volatilizes, condensing in well-formed brilliant needles. Almost insoluble in cold water, and but little soluble in boiling water, it dissolves freely in alcohol, ether, and nitro-benzine. It dissolves, also, in hot acetic acid, and crystallises out again on cooling. Several analyses of specimens prepared by different methods led the authors (MM. Cloez and Guignet, *Bulletin de la Société Chimique de Paris*, No. 1, p. 3) to the following as the formula of the new acid:— $C_{18}H_7(NO_4)O_6$, and induce them to regard it as a product of the oxidation of nitro-cinnamic acid $C_{18}H_7(NO_4)O_4$. In conclusion, they remark that they have experimented with commercial nitro-benzine, and the new acid may come of the oxidation of some foreign body in that article.—*Chem. News, London, May 11, 1861.*

THE NEW ZEALAND IRON SAND.

The following correspondence on this subject has taken place in the columns of the *Engineer*:—Mr. Mushet writes: “Sir,—Having received from Captain Morshead, for the purpose of converting into steel, about three tons, of the Taranaki metalliferous sand, nothing surprised me more than the almost perfect purity of this sand; of which 98.25 per cent. was strongly attracted by the magnet, and 1.75 per cent. only of quartz sand remained unacted upon. The analysis of this ore by Messrs. Johnson and Matthey showed the ore to be composed of:—

Oxide of iron	88.45
Titanic acid	11.43
Loss	12

100.00

Recently I have received from a party not interested in the matter, a fair sample of the Taranaki titanium sand, and which I find is composed as under:—

Magnetic iserine sand	33.60
Non-magnetic ilmenite sand	61.27
Sea sand	5.13

100.00

And according to the analyses given of magnetic iserine and non-magnetic ilmenite, the Taranaki sand as it lies on the shores is composed as under:—

Oxides of iron	61.14
Titanic oxide	29.73
Sand	5.13

100.00

And the yield from the ore in metallic iron will only amount to about 49 per cent. From another source, much nearer home, I have been supplied with a similar titaniferous sand of precisely similar quality; so that I infer that Captain Morshead has been misled as to the purity and richness in iron of the Taranaki sand, which, as supplied to me, appears to have been separated by a magnet from the non-magnetic bulk of the deposit. Or are there two deposits of titaniferous sand at Taranaki, one pure and the other impure? Perhaps Captain Morshead will be kind enough to explain. It will make a most essential difference in the success of the smelting operations which may be undertaken, whether the ore employed be the pure magnetic iserine or the mixed ore consisting chiefly of non-magnetic ilmenite." In reply to this, Captain Morshead writes as follows:—"Sir,—I can have no hesitation in affording to Mr. Mushet, through your columns, the explanation he seeks in his letter of the 20th March, and published by you on March 22. The sand I forwarded to him was, if anything, below a fair average sample, as could be vouched, if necessary, by four or five 'parties,' to use the words of Mr. Mushet, 'not interested in the matter.' There are not two deposits at Taranaki, one pure and the other impure, as suggested by Mr. Mushet. The whole is pure. I did not separate the three tons I gave Mr. Mushet (which were a portion of about ten tons sent over to me) from any other sand by a magnet. The suggestion of picking up such a quantity by such a process is a simple absurdity. If any one will take the trouble to compare Mr. Mushet's present letter with those formerly written by him on the same subject, he will readily discover that Mr. Mushet, having failed to attain some end proposed by himself at the beginning of our acquaintance, is now seeking to destroy the effects of his former letters, and injure a

project he can no longer control. For the present, I am content to rest upon the analysis of the material made (not for me, or at my request) by Messrs. Johnson and Matthey, corroborated as it is by the certificate contained in Mr. Mushet's last letter, of 'the most perfect purity of the sand,' from which, I am glad to inform him, that a steel, far surpassing any made by him, has been manufactured by other parties, and which will shortly be introduced, in large quantities, into the market."—*Chem. News, London, May 11, 1861.*

TOUCHING SPONGES.

Ordinary sponge is one of those precious common things which largely contribute to the comfort of civilized man. Its uses, which are very numerous, depend on its peculiar flexibility, porosity, elasticity, and compressibility. In the hope of finding another substance with the same properties equally well balanced, we might ransack the three kingdoms of nature in vain. In the attempt to replace this unique product by a manufactured article we might waste as much time as the alchemists of old wasted in their fruitless researches. And this wonderful substance, for which we shall probably never find or make a substitute, is produced by animals in which we can discover no trace of special organs—animals of so humble a type that it is difficult to draw a line of demarcation between them and the lowest plants.

Every one knows that ordinary sponge is an animal product, and that it is fished up from the bottom of the sea by divers. I have reason to believe, however, that the knowledge possessed by the majority of educated persons touching this familiar substance is confined to these two facts. Even well-known authors, who are looked up to as scientific oracles, make dreadful blunders when they come to write about sponge. In a popular modern work of reference now before me, I find it gravely stated that sponge is produced by very small marine animals which are called Polypi by naturalists, whereas it is formed by creatures of another type called Protozoa. To enlighten the ignorant, and to dissipate the errors promulgated by book-makers, I will state a few facts, on the authority of Dr. Carpenter, about sponges, and other animals belonging to the same sub-kingdom.

I may here mention that the word "sponge" is applied to the complete animal, as well as to its fibrous skeleton with which we are so familiar.

The sponges belong to the lowest class of animals, and before I can hope to make the reader understand their structure, I must describe the lowest member of the class—a creature which may be said to form the first link in the great chain of life which ends with Man. This microscopic protozoon, which is by no means unfrequently to be met with in stagnant waters and vegetable infusions, is known as the *Amœba*. It may be described as a minute semi-fluid mass of *sarcode*, or formative substance, presenting scarcely any evidence of distinct organization, even of the simplest kind. However inert and shapeless this minute body may be when first noticed, its possession of vital activity is soon made apparent by the movements which it executes, and by the changes of form which it undergoes. The shapeless mass puts forth a finger-like prolongation, which is simply an extension of its gelatinous substance in a certain direction; and a continuation of the same action first distending the prolongation, and then, as it were, carrying the whole body into it, causes the entire mass to change its place. After a short time another prolongation is put forth, either in the same or in some different direction, and the body is again absorbed into it. When the creature, in the course of its progress, meets with a particle capable of affording it nutriment, its gelatinous body spreads itself over and around the precious morsel so as to envelope it completely. The substance thus taken into this extemporized stomach undergoes a sort of digestion, the nutritive material being extracted, and the indigestible part being, as it were, squeezed out of the body. Of the mode of reproduction of the amœba nothing yet is known, save that it undergoes multiplication by self-division, and that portions separated from the mass, either by cutting or tearing, can develop themselves into independent beings. This living speck of jelly, which can get along without legs, and which can convert any portion of its substance into a stomach, may be regarded as the type of the Protozoa.

In the living sponge, the skeleton, usually composed of a fibrous network, strengthened by spicules of mineral matter, is

clothed with a soft flesh, which, when examined with a powerful microscope, is found to consist of an aggregation of amœba-like bodies, some of which are furnished with long *cilia* (hair-like appendages) by the agency of which a current of water is kept up through the passages and canals excavated in the substance of the mass. From observations which have been made upon the early development of sponges, it appears that they begin life as solitary amœbæ, and it is only in the midst of aggregations formed by the multiplication of these that the characteristic sponge structure makes its appearance; the formation of spicules being the first indication of such organization. The ciliated cells seem to form the walls of the canals by which the whole fabric of the sponge is traversed. These canals, which are very irregular in their distribution, may be said to commence in the small pores of the surface, and to terminate in large vents; and a current is continually entering at the former and passing forth from the latter during the whole life of the sponge, bringing in alimentary particles and oxygen, and carrying out refuse matter. The skeleton, which gives shape and substance to the mass of sarcode particles that constitute the living animal, is composed, in the sponges with which we are most familiar, of an irregular reticulation of fibres. Most sponges are strengthened by calcareous or siliceous spicules, and the variety of forms presented by these bodies is almost endless. In the ordinary sponge, *Spongia officinalis*, the fibrous skeleton is almost entirely destitute of spicules; but in the curious and beautiful *Dictyochalia pumiceus* of Barbadoes, the entire network of fibres is composed of silex, and is so transparent that it looks as if composed of spun glass.

With the exception of those that belong to the genus *Spongilla*, all known sponges are marine, but they differ very much in habit of growth; some are only found at considerable depths, others live near the surface, and many attach themselves to rocks and shells between the tide-marks. The average depth at which the best Turkey sponges are found is thirty fathoms; those of an inferior quality are found at lesser depths.—*Chemist and Druggist*, Jan. 1861.

ON THE AMOUNTS OF LEAD CONTAINED IN SOME SILVER COINS.

BY ELIOT AND STORER.

The determination of the amount of lead in American silver coin was suggested to the authors by finding half of one per cent of lead in a sample of zinc such as is used at the United States mint for reducing chloride of silver. (See their Memoir on the Impurities of Commercial Zinc in *Memoirs Amer. Acad.* [N. S.], viii. 61; also this Journal [2], xxxi. 142). For the sake of comparison other coins were subsequently examined.

Kind of coin.	Per cent of Lead in the coin.
1 American half-dollar of 1824,	0.310
20 " five-cent pieces of 1853,	0.209
10 " ten-cent " of 1854,	0.228
2 " twenty-five cent pieces of 1858,	0.231
" Fine Silver" from the U. S. Assay Office in N. York, 1860,	0.161
1 Spanish dollar of 1793, Carolus IV.	0.056
1 Mexican " " 1829,	0.043
2 English Shillings of 1816,	0.485
1 French five-franc piece of 1852, Napoleon III.	0.428

On the supposition that the zinc used in the reduction of the silver is the source of the lead in the American coin, the authors calculate the amount of lead which would thus find its way into the coin. Their memoir, already cited, gives the per cents of lead found in two specimens of Vieille Montagne zinc; if zinc of the best quality (containing 0.292 per cent of lead) had been used, the silver coin would have contained 0.158 per cent of lead; if the second quality (containing 0.494 per cent of lead) had been employed, the coin would have contained 0.268 per cent of lead. Between these two limits all their determinations of lead in American silver coins lie. In offering this explanation of the occurrence of lead in American silver coin, the authors would by no means affirm that the zinc is the exclusive source of this impurity, for it is not at all improbable that a portion of the lead is derived from the leaden vats in which the reduction of the chloride of silver is effected, or from the sulphuric acid which is used to excite the reaction. The process of analysis was such as to permit the separation of the gold contained in each kind of coin. A distinct button of metallic gold was obtained in every instance, before the blowpipe, but the amount of gold varied to a considerable extent; it was abun-

dant in the American and Spanish coin, less was observed in the English and Mexican, and but little in the French coin or in the American fine silver. Brüel has remarked "that the process of separating lead and silver was less perfectly executed in the ages of antiquity than is at present the case," (*Karsten u. Dechen's Archiv für Mineralogie, etc.*, 1844, xviii. 509,) yet in none of the recorded analyses of ancient silver coins has any one detected so large an amount of lead as the authors have shown to occur in American fine silver of the year 1860, if a single analysis of Prof. Draper's be excepted which gave nearly three per cent of lead in a silver coin of Hadrian. It is probable, however, that the methods of analysis—none of which are recorded—employed for separating lead from silver by other chemists, were less delicate than those which the authors made use of and have fully described. The occurrence of lead in the American silver coin could probably be mainly, if not altogether, avoided, by employing zinc free from lead, such as is produced at the Zinc Works of Bethlehem, Pennsylvania. It is noteworthy that the American system of amalgamation, which has been so frequently criticised by European metallurgists, affords silver which is less strongly contaminated with lead, and is probably purer in other respects, than is produced by any other process of manufacture.—*Silliman's Journ. May 1861, from Proc. American Academy.*

CONVALLARIA IN ECCHYMOSES.

A writer in the *Medical Times and Gazette* says:—"A correspondent asks the communication of an affective remedy for ecchymosis of the eye in a lady patient who had met with an accident. One which I have used for a great many years, never disappointing me, usually getting rid of the blackness in a few hours, is the root of the 'Convallaria,' 'Solomon's Seal.'" It should be washed, the dark colored cuticle carefully cut off, then scraped like horse-radish, applied direct to the eye in the way of a poultice, cold. A tingling sensation is the consequence; when this sensation ceases, another fresh application should be made, and repeated until the whole ecchymosis is absorbed. I have often found it sufficient to apply the scraped root at bedtime to the closed eye, when the blackness has disappeared by the morning. The convallaria is readily found, and is equally effectual at this season of the year.—*Druggists' Circular.*

ON THE DISCREPANCIES IN THE STATEMENTS OF PELOUZE AND F. MOHR, RESPECTING THE SOLUBILITY OF GALLOTANNIC ACID IN ETHER.

BY PROFESSOR BOLLEY.

For the extraction of tannic acid from coarse gall-nut powder, in his "Displacement Apparatus," Pelouze recommends the use of ordinary, not absolute, ether. The liquid which then runs off, separates into two layers, the lower of which is thickish, while the upper is mobile and less colored. The lower liquid contains the tannic acid, and is regarded by Pelouze as a solution of tannic acid in water; the upper liquid is stated to be ether, holding in solution small quantities of tannic acid, coloring matter, &c.

Mohr, in his commentary on the Prussian Pharmacopœia, decidedly contradicts this statement. His view of the matter has found its way into most Manuals of Chemistry, articles in Chemical Dictionaries, &c., and is generally received as correct. He regards the lower stratum of liquid above-mentioned as a *concentrated solution of tannic acid in ether*; and the upper, as *ether* which has dissolved only a small quantity of tannic acid. The two layers, he maintains, are not soluble one in the other. If this be so, it affords another example of a condition hitherto known to exist in one instance only (that of coniine), in which the solution of a body in a certain solvent is not diluted by contact with that solvent. In spite of this anomaly, Mohr's statement has been adopted without experimental verification. Mohr rests his view on an experiment described by himself. On treating tannic acid with anhydrous ether, he obtained the thickish layer already mentioned, and above it there floated a stratum of ether, containing only a small quantity of tannic acid.

I have likewise examined this peculiar phenomenon. I find that *anhydrous ether* (previously decanted several times over chloride of calcium, boiling at 34.9° C., and having a specific gravity of 0.724 at 11.25° C.), takes up but a very small quantity of tannic acid, indeed scarcely any (0.206 p. c. at 5° C.), while the greater part of the tannic acid remains in the liquid in the form of a dry compact powder. On mixing the ether with half

its volume per cent. of water, the thickish liquid is formed. The other—the upper layer—when mixed with a little water, takes up rather more tannic acid than the anhydrous ether. I find that the upper layer—pure ether with 1 vol. p. c. of water—takes up 1.2 p. c. tannic acid.

This result appears to confirm Pelouze's view. It is not, however, true that the syrupy layer is a concentrated aqueous solution of tannic acid. On carefully removing a portion of this liquid, so that none of the upper stratum may mix with it, introducing it into a retort, and distilling with good condensation, considerable frothing takes place at first, and ether passes over, followed by water, the two liquids forming layers of equal depth in a cylindrical receiver.

If a little water be added to these two liquids, a third layer is formed, which rests between the two, and is therefore insoluble both in ether and in water. This behaviour appears to me to render probable the existence of a chemical compound of tannic acid, ether, and water, possibly an acid ethyl-salt constituted like ethyl-sulphuric acid, that is to say, a *tannate of ether and water*.

There is a practical deduction from these experiments which deserves to be mentioned. The behaviour of pulverized and well dried tannic acid to ether, is so peculiar that it may be used as a test of the presence of water in that liquid. In anhydrous ether the powder remains quite unaltered, but in hydrated ether it cakes together or deliquesces to a thickish syrup, according to the amount of water present, and the quantity of tannic acid added. Very small quantities of tannic acid gave a distant reaction.—*London Pharm. Journ. March, 1861 from The Quarterly Journal of the Chemical Society.*

CHLOROFORM LINIMENT IN TOOTHACHE.

Take the white of an egg, and add an equal bulk of chloroform, and digest four hours at an ordinary temperature. Apply this to the gum, immediately above the aching tooth, by saturating a piece of lint, over which is to be placed a second piece of dry lint larger than the first, in order to protect the lips, which are to be allowed carefully to fall on the two in order to retain them

in their places. We have found this invaluable in the relief of such disturbances as are not dependent on fully developed inflammation, such as neuralgic disturbances, and the first stages of periostitis. A more powerful liniment can be made by taking one part of white of an egg and four of chloroform, placing them in a bottle, which is to be completely plunged into a water-bath at from 120° to 140° . Gelatinization takes place in four minutes. This is to be rubbed on any painful part, and great relief is produced. The slow cauterization it gives rise to, and the protection of the part from the atmosphere, render it a very powerful counter-irritant. The cold preparation is perhaps the best and easiest made, and when a decided effect is required, it should be repeatedly used.—*London Pharm. Journ. April, 1861, from American Journal of Dental Science.*

MODE OF DISINFECTING AND PERFUMING COD LIVER OIL AND CASTOR OIL.

By M. JEANNEL.

It is generally known that bitter almonds, being introduced in a potion along with musk, will destroy almost entirely the odor of the latter. Syrup of orgeat, water distilled from the cherry laurel, and all the cyanogen compounds, produced the same effect. Many apothecaries are accustomed to clean their mortars, when used for the trituration of musk, by rubbing in them the wet paste which remains as a residue in the preparation of emulsions. Lately, the distilled cherry-laurel water has been prepared for the disinfection of sores by Dr. Autier, of Amiens.

Cod-liver oil has been purified by means of the essential oil of Mirbane, which is nothing else than nitrobenzine, in the proportion of two thousandths. This plan has even been the object of a patent obtained by a Paris pharmacist. The addition has, however, two inconveniences; the introduction in the oil of a substance whose action on the animal economy is injurious, and the protection of the patent.

The above considerations lead me to attempt to purify and perfume cod-liver oil and castor oil by means of the cyanogen compounds. After a series of experiments, I have determined

that, 1, the essential oil of bitter almonds, in the proportion of 5 decigrammes to 100 grammes, will cause the nauseous odor and fishy taste of the most impure cod-liver oil to disappear. The amount of essential oil required to obtain the desired result varies with the fetidness of the oil; 2, 6 centigrammes of anhydrous cyanhydric acid dissolved in water would suffice to disinfect 100 grammes of cod-liver oil, but would not perfume it; 3, distilled cherry-laurel water seemed to me to afford the best means of obtaining the desired result. It is sufficient to shake strongly in a flask the cod-liver oil along with an *equal* or *double* volume of distilled cherry-laurel water, according to its richness and the amount of impurity of the oil, then separate the two liquids by means of decantation after 24 hours rest. If the oil is not quite clear, it must be filtered through paper to get it limpid*. The impure brown oil acquires, by this simple process, a very delicate odor and an agreeable taste of almonds, and the latter remains in the mouth so long as digestion of the oil is going on. To the oil, thus disinfected, may be added a fifth or even a fourth of its weight of ferruginous cod-liver oil, containing one per cent. of ferric acid, without the odor and taste of this ferruginous oil being strongly communicated to the mixture.

Numerous patients have employed the oil thus disinfected either by cherry-laurel water, or by the essence of bitter almonds, for one month, without any appearance of modification of their ordinary effects. The dose has been increased up to 100 grammes a day without any unfavorable indication from the employment of this oil, which should be henceforth adopted even in cases where it is most difficult to take medicine.

Three drops of essence of bitter almonds communicate an odor and agreeable taste to 100 grammes of the nauseous castor oil of commerce. The purgative action is not changed. This slight addition makes easy the administration of this excellent purgative, against which the repugnance of so many patients causes them to rebel.—*Journ. and Trans. Md. Col. Pharm. March, 1861, from Journal of Pharm. et de Chim.*

* It is important to observe that none of these methods will cause the *acid* taste resulting from rancidity of the oils to disappear. Rancidity is a very different thing from the fishy odor and taste.

DIFFUSION OF GERMS, (PANSPERMIA,) RESEARCHES UPON SPONTANEOUS GENERATION.

We recently gave our readers the views of this question entertained by Pouchet; many scientific men have pronounced against the conclusions of this zoologist, and have referred the origin of the vegetable mycoderms obtained by him, where the atmospheric air was excluded, to microscopic germs floating in the air, and which are so small that they may be introduced into the apparatus, despite the precautions taken to exclude them. According to this theory it is necessary to suppose that the air is full of these germs, therefore Pouchet has undertaken to submit the atmospheric air to microscopic examination. He has not found either germs or spores of infusoria in the dust suspended in the air, but he has found a great number of grains of starch. The air of great cities and other inhabited places, contains many of these starch grains, which, according to him, one might take to be eggs of infusoria, or germs of mycoderms. He has found them among the dust of old cathedrals, and even from dust obtained from Egyptian mummies, and the chambers of the pyramids, as well as among the ruins of Grecian temples. Yet there must be something in the air which has escaped recognition by the microscope, for by causing a quantity of air to pass through a tube containing calcined asbestos, and introducing some of this material into liquids which previously had access only to calcined air, and which consequently contained no trace of vegetation, Pasteur has been able to develop mucedines. We have seen the apparatus of this chemist in use at the *Ecole Normale de Paris*. This apparatus is remarkable for its simplicity and its precision, and it is impossible to object to his conclusions, for they preclude the possibility on the part of nature to continue her creative work in connection with elements purely mineral, or to animate them with the organic influence.

This chemist has already informed us, that, in order that vegetation may be developed, or fermentation produced, there is required a liquid containing water, a salt having ammonia as a base, a carbonaceous substance, and a phosphate; the air is necessary only for the moment while we introduce into the flask some spores of *penicilium*, or a little dust obtained from the air

by the process indicated above. The mycodermic vegetation is then developed in less than a day, and, what is particularly remarkable, it is developed in the dark as well as in the light. The ordinary law does not govern these little organisms, for they neither give out oxygen nor absorb free carbonic acid; but on the contrary they disengage carbonic acid, and increase by fixing ammonia and phosphoric acid. The germs which produce these marvellous effects are not uniformly distributed in the air; thus Pasteur, making comparative experiments with one and the same liquid arranged in flasks completely deprived of air, found that the air from the cellars of the Observatory contained only one-tenth part as many germs as the air from the court of that establishment; and that the air contained fewer germs in proportion to its elevation in the atmosphere. This chemist has performed comparative experiments in the mountains of Jura, at an altitude of 800 metres, and in the Alps at Montanvert, (Savoy), at 2000 metres above the level of the sea; and he has proposed to take the air from a much greater elevation by the aid of a balloon.

These researches present an interesting field to the naturalist. Pasteur has many species in vegetation, new and hitherto unknown. By varying the conditions, it will doubtless be possible to obtain others, as Paul Laurent has already done with the infusoria, in a work of which we shall speak further on. On the occurrence of these researches, Boussingault called attention to a fact pointed out by Bineau, of Lyons, who, while examining a specimen of rain-water, containing nitrates and ammonia in solution, found these materials disappearing under the influence of cryptogamic vegetation. In reference to this great question of the assimilation of nitrogen, we would refer the reader, who wishes to understand it thoroughly, to the valuable work of Boussingault, just published, entitled, "*Agronomie, Chimie Agricole et Physiologie.*"

In order that plants may be developed in meteoric waters, these waters should be found in the condition of Pasteur's liquids. It is known that rain-water contains assimilable nitrogen and also salts of potash, soda, lime, &c., but it has heretofore lacked the indispensable element, phosphoric acid, which had never been detected in rain-water. This chasm in the series of fer-

tilizing principles of meteoric waters has at length been filled by Barral, who has discovered phosphates in rain-water. To avoid all sources of error, this chemist has experimented entirely with an apparatus of platinum. In the residue of evaporation he has obtained the phosphorus in the condition of phosphoric acid, as phosphate of bismuth, (Chancel's process), and as the ammoniaco-magnesian phosphate. He has thus found a quantity of phosphoric acid, varying from .05 to .09 of a milligram to a litre of rain-water ($= 0.0005$ to 0.0009 gram.)

From these results it may be calculated that the rain-water of an ordinary shower furnishes about 400 grams of phosphoric acid to the French *hectare* or ($2\frac{1}{2}$ English acres). Now since the researches of Boussingault have proved that a hectolitre ($2\frac{3}{4}$ bushels) of wheat takes from the soil about one kilogram of phosphoric acid, we see that to obtain seven or eight hectolitres of wheat to the French *hectare*, which corresponds to a harvest without the use of manure, it would be necessary to let the field repose for twenty years, if the soil did not previously contain a trace of phosphates. Barral in 1850 to 1852, made researches upon rainwater to detect the presence of phosphoric acid in the residue of evaporation; the udometers and other vessels of platinum employed in the present investigations were constructed at the expense of the Academie des Sciences.—*Silliman's Journal*, March, 1861.

EXTRACT AND FLUID EXTRACT OF CIMICIFUGA.

BY J. F. MOORE.

Read before the Maryland College of Pharmacy, Feb. 14th, 1861.

The largely increased demand for cimicifuga and some of its preparations, especially the extract, has led me to observe the very variable character of the latter, as prepared not only by different pharmacutists, but at different times by the same person.

Some samples I have examined appeared to contain nothing but the resinous portion of the root, whilst others contained little or none of that constituent. Again we find samples containing both the resinous and aqueous portion of the root, but separate and distinct from each other. This great difference is no

doubt owing to the difficulty of combining the resinous with the aqueous product.

I have for some time past prepared the extract for my own use by the following process as suggested by Mr. Andrews, and whilst not entirely free from objection, it is more reliable than any I can obtain from the trade.

Take of Powdered Cimicifuga (No. 50), any quantity.

Alcohol 95 per cent.

Diluted Alcohol, (alcohol 1 part, water 2 parts) of each a sufficient quantity,

Moisten the powdered root with the alcohol and pack closely in a displacer; add gradually 95 per cent. alcohol until the resinous portion is exhausted; evaporate the alcoholic portion to dryness, powder the product and pass it through a fine sieve; proceed to displace with diluted alcohol until the root is perfectly exhausted, evaporate the resulting product over a water-bath until it is of nearly the required consistence of a good extract, then mix the powdered resinous portion while the fluid is still warm and stir constantly until cold.

In this way the resin is intimately and smoothly mixed with the extractive portion; is much more readily rubbed down with aqueous solutions; and contains all the active ingredients of the root: but however carefully prepared I find that change of temperature is liable to more or less separate the resin and extractive.

I have thought that the fluid extract containing all the active ingredients in a more permanent combination, and representing the root in strength, would be a more eligible form of administering it; especially as a substitute for the large doses of the powdered root, I have prepared it in the following manner and found it to give much satisfaction where it has been used.

Take of Pulv. Cimicifuga (No. 50), 16 ozs., troy.

Alcohol 95 per cent.

Diluted Alcohol, of each a sufficient quantity.

Moisten the root with the alcohol, pack closely in the displacer, and pour on alcohol gradually until eight fluid ounces have passed through, which reserve in a covered vessel to prevent evaporation, then proceed with diluted alcohol until the root is

thoroughly exhausted. Evaporate over a water-bath until all the alcohol is driven off; set it aside to cool, that the resinous portion extracted may be deposited, which separate and add to the alcoholic portion first obtained; then proceed with the evaporation until reduced to eight fluid ounces, and mix the two products; allow it to stand 48 hours and then filter.—*Journ. and Trans. Md. Coll. Pharm*, March, 1861.

ELIXIR OF THE VALERIANATE OF AMMONIA.

BY TROVILLO H. K. ENOS.

Read before the Maryland College of Pharmacy, Feb. 14th, 1861.

A preparation, known as "Pierlot's solution of valerianate of ammonia" has long been in use among the physicians in Philadelphia; but the disagreeable taste and odor of the "solution" having been found objectionable to patients, the pharmacutists have been led to suggest some mode of disguising both, and presenting the preparation in a pleasant and agreeable form of administration, without materially altering its effect; and the form of an elixir has been generally adopted.

Having received several prescriptions for the preparation, and believing it to be the duty of the dispensing pharmacist to prepare as much as possible, such preparations, instead of depending for a supply on foreign sources, I have devised the following formula, which will be found to answer the purpose intended, and I hope may be useful to others.

Take of Acid. Valerianic., 1 fluid drachm.

Ammon. Carbonas, a sufficient quantity to neutralize the acid.

Alcohol,

Syrup. Simplex, of each 1 fluid ounce.

Ext. Aurantii cort., 2 fluid drachms.

Aqua Flor. Aurantii, $\frac{1}{2}$ a fluid ounce.

Aqua destillata, a sufficient quantity to make four fluid ounces.

Dilute the acid with about 4 fluid drachms of water and neutralize with the ammonia, then add the alcohol holding the aromatic extract in solution, the syrup and orange flower water, and finally filter.

Any inert coloring matter may be added to please the fancy of the operator.

Each *fluid drachm* contains *two grains* of the salt.

Curacoa cordial is frequently used in disguising the disagreeable taste, not only of Valer. Ammon., but other pharmaceutical preparations.—*Journ. and Trans. Md. Coll. Pharm.*, March, 1861.

HYDRIODATE OF AMMONIA.

By MURRAY THOMSON, M. D., F. C. S.

Lecturer on Chemistry, Edinburgh.

There are at present two methods in use for the preparation of this salt. One of these is the same as that given in the Edinburgh Pharmacopœia for the preparation of iodide of potassium, only that the iodide of iron, which is first made, is decomposed by ammonia or carbonate of ammonia, instead of by carbonate of potass. By separating with a filter the insoluble oxide or carbonate of iron, the hydriodate of ammonia is obtained in solution, which it is now only necessary to evaporate, at not too high a temperature, so as to obtain the salt. The other method is to make first a solution of hydriodic acid, by passing sulphuretted hydrogen gas into iodine suspended in water. Hydriodic acid is thus formed, and sulphur precipitated; the latter is separated by filtration, and the acid filtrate is neutralized with ammonia or carbonate of ammonia, and then evaporated to dryness as before.

In either of these ways the salt may be made quite pure, at least so far as obtaining a solution of it is concerned. It is in the evaporation of this, so as to get the dry salt, that the difficulty lies in obtaining it quite colorless. Almost invariably as the drying of the salt is just being finished, a slight decomposition takes place, and some of the iodine is set free, and communicates its brown color to the whole mass. To obviate this tendency to decomposition is the purpose of my improvement, and it consists, in the first place, in taking care that the salt during the time of its being dried, shall always contain a slight excess of ammonia; and, secondly, in re-converting the liberated iodine into hydriodic acid, by from time to time allowing a small

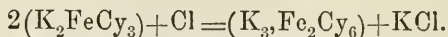
amount of sulphuretted hydrogen gas to flow over the salt while it is being dried, an apparatus to evolve the gas being kept at hand during the operation. The effect of adding the gas is, that the brown salt almost immediately becomes white. As soon as this bleaching, so to speak, is effected, the stream of gas is withdrawn and the drying continued, and only resumed if iodine should be liberated a second time. If the salt is well prepared at first, it seldom needs the second application. As soon as the salt is dry, it should, while warm, be put into a dry stoppered bottle, as it is deliquescent. As long as the salt is dry, it will keep a long time colorless, but if it get damp, it is partially decomposed and again gets brown, but its colorless condition may again be restored by a repetition of the above treatment.

It must be admitted that an infinitesimal amount of sulphur finds its way in among the salt, by the use of the sulphuretted hydrogen gas as a decolorizer; in fact, whatever quantity of that gas is actually consumed, has its sulphur precipitated into the hydriodate. To show, however, that this is really no drawback to the use of the gas, I may mention that an exceedingly small amount of free iodine is enough to communicate a considerable depth of color to a comparatively large amount of the hydriodate. Now, it is to yield hydrogen to this iodine that the sulphuretted hydrogen gas is employed. The greater part of the gas is, however, dissipated as such, and the quantity of sulphur, therefore, is necessarily small in quantity; in fact, it is so minute, that I have not been able to detect its presence in the samples I have prepared by this process, although I employed our most delicate tests for sulphur. I beg, therefore, to recommend the above process for adoption in the preparation of hydriodate of ammonia, a salt which most will agree is far from being easily obtained in a colorless condition.—*London Pharm. Journ.* May, 1861.

ON THE VALUATION OF CHLORIDE OF LIME.

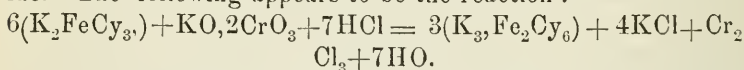
Some years back Mr. Mercer suggested a process for assaying chloride of lime, depending on the use of ferrocyanide of potassium. This process will be found described in Parnell's work on Analysis. It consisted in adding so much of the chloride of lime to a known weight of the ferrocyanide as exactly to

convert the latter into ferridcyanide. The available chlorine of the chloride reacting on the yellow prussiate in the usual manner:—



The exact point at which complete conversion had taken place was ascertained by taking out a drop of the liquid and testing it with a persalt of iron. Mr. Mercer's process does not appear to have obtained much attention from chemists; quite recently, however, Dr. Davy, of Dublin, has been engaged in some experiments on the application of ferrocyanide of potassium to several analytical processes, and has, therefore, been led to examine this method and suggest several improvements in it.

Dr. Davy finds that Mr. Mercer's process gives no better results than the methods commonly in use, and that a certain loss of chlorine always occurs. He introduces, therefore, an important modification of the process by which this loss may be avoided. It depends on the action which ferrocyanide of potassium exerts on bichromate of potash. When these two salts are mixed in solution in presence of hydrochloric or sulphuric acid, the ferrocyanide is immediately converted into ferridcyanide. The following appears to be the reaction:—



Dr. Davy applies this reaction thus:—He mixes together a certain quantity of a standard solution of ferrocyanide with a given amount of a graduated solution of the chloride of lime, using more of the former than the latter can convert, then adding hydrochloric acid to dissolve the precipitate formed and render the mixture strongly acid, and finally ascertain how much of the ferrocyanide remains unconverted by dropping in from a burette a standard solution of bichromate, till a minute drop taken from the mixture ceases to give a blue or greenish color with a persalt of iron, but produces instead a yellowish-brown.*

*The yellowish brown coloration which is at first produced when enough of the bichromate has been added, quickly changes to a greenish color by some secondary reactions which take place when the persalt of iron is left in contact with the mixture. But this does not interfere with the test; for it is the first effect which is produced which indicates the completion of the reaction, and not the after-changes which may result.

The following is the method he recommends for applying this principle to commercial valuations :—

“ Having obtained a flat-bottom flask or bottle which will contain 10,000 grains of distilled water when filled up to a certain mark in the neck, make two standard solutions, the first by placing in a flask or bottle 1190 (or exactly 1189.97*) grains of the purest crystallized ferrocyanide of potassium (yellow prussiate of potash) reduced to powder, adding distilled water to dissolve the salt, and when this is effected filling up with water to the mark; and having mixed the solution thoroughly, place it in a well-stoppered bottle. The second standard solution is made in the same manner, substituting for the ferrocyanide 138.6 (or exactly 138.58) grains of bichromate of potash which has been purified by recrystallization and fused in a crucible at as low a heat as possible. Both these solutions will keep unchanged, and will answer for a number of determinations if they are preserved in well-stoppered bottles, and the ferrocyanide solution be kept, when not in use, excluded from the light. Get a burette or alkalimeter capable of holding or delivering 1000 grains of distilled water, and divided into 100 equal divisions; also two small bottles, one capable of delivering 1000 grains, and the other 500 grains of distilled water when filled up to a certain mark on the neck of each,† which may both be readily made by filling them with water, emptying them, and after they have drained for a minute or two, weighing into each the above weights of distilled water; or, what will be sufficiently accurate for most purposes, pour from the burette into 100 divisions of distilled water, and into the other 50, and mark with a file where the fluid stands in the neck of each bottle. Having these already,

* The above numbers are obtained as follows :—35.5 parts of chlorine are capable, as before stated, of converting 422.44 parts of the crystallized ferrocyanide of potassium into ferridcyanide; therefore 100 parts of the former will convert 1189.97 parts of the latter into the same compound. Again, as before observed, 1267.32 parts of the crystallized ferrocyanide require 147.59 parts of the bichromate of potash to convert them into the ferridcyanide; 1189.97 parts, therefore, will take 138.58 parts of that salt to produce the same effect.

† Two small pipettes capable of delivering the above quantities would be found still more convenient.

take an average specimen of chloride of lime, and weigh out 100 grains of it, and make in the usual way a solution of it by trituration in a mortar with some water; pour it into the flask which was used in preparing the two standard solutions, and having filled up with water to the mark in the neck, mix the solution thoroughly; and before each time that any of the chloride of lime is taken out, shake well the contents of the flask.

“ Measure out into a beaker-glass, by means of the two little bottles, 100 divisions of the chloride of lime solution, and 50 of the standard solution of ferrocyanide; and having mixed them well together, add some hydrochloric acid to dissolve the precipitate formed and acidify the mixture strongly; and having mixed the whole well, pour from the burette slowly the standard solution of bichromate (stirring well all the while) till a drop taken from the mixture and brought in contact with a drop of a very weak solution of perchloride of iron produces a yellowish-brown color, as already noticed. Then read off the number of divisions of the standard solution of bichromate which was necessary to produce this effect; and this being deducted from 50, gives the per-centage by weight of chlorine.

“ For the standard solution of ferrocyanide having been made so that the 10,000 grain measure should be equivalent to 100 grains of chlorine, and as every division of the burette equals 10 grains, each of these divisions of the ferrocyanide solution converted into ferridcyanide will indicate 0.1 grain of chlorine. Again, the 100 divisions of the solution of chloride of lime represent 10 grains of that substance, and we want to know how many divisions of the ferrocyanide solution its chlorine has converted into ferridcyanide. This is readily ascertained by the bichromate solution, which has been so graduated that each division represents a division of the ferrocyanide solution. So that to determine the per-centage of chlorine we have only to deduct, as before stated, the number of divisions of the bichromate solution employed from the 50 of the ferrocyanide solution, and the difference gives us the per-centage of chlorine by weight in the sample; thus in four experiments 50 divisions of the ferrocyanide solution mixed with 100 divisions of the solution of chloride of lime, required 18.5 divisions of the bichromate

solution to convert the whole of the ferrocyanide employed into ferridcyanide; this number taken from 50 leaves 31.5 divisions of ferrocyanide, which were converted into ferridcyanide by the chlorine of chloride of lime; and as each division represents 0.1 grain of chlorine, 31.5 will be equivalent to 3.15 grains of chlorine, which is the amount contained in 10 grains of the sample; consequently 100 grains will contain 31.5 grains of chlorine, which is the same amount as is obtained by simply deducting the number of divisions of bichromate solution employed from 50 of ferrocyanide used in the estimation."

Though this process appears a long one, from the details which are necessary to explain its principle, yet in practice it is very expeditious, and requires only a very few minutes for its performance, and is much quicker than either Gay-Lussac's or Otto's method.

The great purity of commercial ferrocyanide of potassium, its definite composition, and the little tendency it has to change by keeping, constitute the advantages of this process.

Dr. Davy also suggests in his paper the *use of dried ferrocyanide as a reducing flux*. He finds that it is quite as delicate, if not more so, than black flux, or cyanide of potassium, for the reduction of minute quantities of arsenic or mercury, while it has the great advantage of not being at all deliquescent. It does not require any admixture with a carbonated alkali.—*London Pharm. Journ.* May, 1861.

ON THE PREPARATION OF SMELLING SALTS.

BY MR. ALFRED ALLCHIN.

There is, no operation in our daily avocations that we are more frequently called upon to perform than that of preparing smelling-salts, and yet I do not recollect to have seen any formula published that would convey the means of doing so in a perfectly satisfactory manner.

I have for some years been in the habit of making smelling-salts by a process which, I believe, possesses so many advantages, that I venture to bring it before the notice of the Pharma-

ceutical Society, thinking that it will probably interest some of the members.

I will first describe exactly the process I adopt, and afterwards give the chemical explanation of the process.

Take of good commercial sesquicarbonate of ammonia 40 avoirdupois ounces, break it into small pieces, the largest of which should not exceed in size that of a filbert, and put it into a chemical air-tight jar having a capacity of half a gallon. Then pour over it 20 fluid ounces of strong solution of ammonia (sp. gr. .880), previously perfumed according to taste, and immediately fix on the lid of the jar, taking care that it is properly secured, and keep it in a cool place, stirring the salt with a stiff spatula every other day for a week. Afterwards allow it to remain for two or three weeks, at the expiration of which time it will have become hard—so hard, indeed, that if the precaution of stirring the salt were neglected, it would be almost impossible to remove it without breaking the jar.

The period during which the salt should be left in the closed jar sometimes varies a little, but if at the expiration of three weeks from the time at which the mixture was made it has not become sufficiently hard, it should be allowed to remain for a few days longer, and then put into a mortar and reduced to coarse powder, so as to admit of its being readily introduced into any ordinary smelling-bottle.

When thus prepared, I generally keep it in well-stopped bottles, each containing one or two pounds' weight, and in this state it improves by keeping. In using it for filling smelling-bottles, after putting the dry salt into the bottle a further quantity of the *volatile essence* should be added, in the proportion of about one drachm to an ounce of the salt. After making this addition, the mixture will assume a crystalline appearance, somewhat resembling salt of tartar, and it is in this state that I consider it to be in the best condition for use. It is strongly, but pleasantly, pungent, and continues to be so almost as long as any of the salt remains in the bottle.

The perfume that I have used is that recommended by Dr. Redwood, in his *Supplement to the Pharmacopœia*, and is as follows :—

Take of

English Oil of Lavender,	} each ʒiv.
Essence of Musk,	
Oil of Bergamot, ʒij.	
Oil of Cloves, ʒj.	
Otto of Rose, gtt. x.	
Oil of Cinnamon, gtt. v.	

This quantity is added to an imperial pint of strong solution of ammonia.

I will now give the data upon which this process is founded.

Sesquicarbonate of ammonia consists of—

2 equivalents of ammonia,	17 + 2 = 34
3 equivalents of carbonic acid,	22 + 3 = 66
2 equivalents of water,	9 + 2 = 18

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Now, to get good smelling-salts it is necessary to convert this sesquicarbonate into neutral carbonate of ammonia, and in order to do this we must introduce half as much more ammonia as it already contains. This is done by the addition of a strong solution of ammonia, but there are probably few persons who, in adding the *Liquor Ammoniac*, are aware of the quantity required, or of the circumstances under which the union is effected and the most satisfactory result obtained. On referring to Dr. Dalton's table of the quantities of ammonia contained in *Liquor Ammoniac* of different specific gravities it will be found that strong solution of ammonia, of sp. gr. .880, which nearly corresponds with the *Liquor Ammoniac Fortior* of the Pharmacopœia, contains 27.3 grains of ammoniacal gas in 100 grains of the solution. Now, as 118 grains of sesquicarbonate of ammonia contain 34 grains of ammonia, and require the addition of 17 grains more to convert it into neutral carbonate, we must use 62.2 grains of strong solution of ammonia to supply the required quantity. In my process I have ordered only 59 parts of *Liquor Ammoniac* to 118 parts of a sesquicarbonate, but the further addition which is directed to be made when the salts are put into a smelling-bottle will rather more than make up the theoretical quantity, giving a slight excess of free ammonia.

Liquor Ammoniac of other strength than that I have indicated

might be used in equivalent quantity, but not, I think, without disadvantage. By using the solution of sp. gr. .880, which very nearly corresponds with the stronger solution of the Pharmacopœia, we are enabled to convey to the sesquicarbonate the required quantity of ammonia without adding so much water as to liquefy any portion of the salt, and without danger in conducting the process. It may not be out of place to mention, as a precaution, that the strongest *Liquor Ammoniac* boils at a temperature below 70° Fahr., so that considerable care is necessary in using large quantities of this solution, and also in preserving the store bottles in a cool place.

In the third volume of the *Pharmaceutical Journal*, at p. 265, a formula is given for Preston salts, which, I believe, is very commonly adopted. It is to fill the bottles with sesquicarbonate of ammonia in small pieces, and then to add one drachm of volatile essence to each bottle. Now, Preston salt bottles hold, as nearly as possible, one ounce of sesquicarbonate of ammonia, which quantity, I think I have shown, would require nearly five drachms of strong solution of ammonia to convert it into neutral carbonate. The common method of adding volatile essence or strong solution of ammonia to the sesquicarbonate at the time of filling a smelling-bottle for immediate use is subject to two objections; first, that the solution is not thus added in sufficient quantity; and secondly, that the ingredients are not confined together for a sufficient length of time to ensure their union, before the bottle has been frequently opened, and much of the ammonia allowed to escape. In the process I have recommended these objections are obviated, and a product is obtained which is fit for immediate use, and which is volatile and pungent almost as long as any of the salt remains.—*London Pharm. Journ. May, 1861.*

ON THE VALUE OF DIFFERENT KINDS OF SOAP.

By R. GRAEGER.

Complaints of consumers in regard to the value, or rather efficacy, of samples of soap, which to the best of the manufacturer's knowledge have been well prepared, are not uncommon.

It is very probable that the usual explanation which is offered, whenever a soap fails to fulfil the expectations of its consumer, viz. that it contains too much water, may be in many cases correct. Admitting this, and various other contingencies, which are of importance in deciding upon the value of a soap, there appears to be another obvious reason why different soaps containing equal amounts of water may still possess different degrees of efficacy.

It is evident from the different equivalent weights of the various fatty acids, that the amounts of caustic alkali taken up by them in the formation of soap must be of unlike magnitude.

If it be true, that the detergent power of soap is entirely dependent upon the amount of alkali which it contains, of course it follows that those soaps which contain the largest proportion of alkali—or in other words, those containing a fatty acid, the equivalent weight of which is small—must be the most efficacious.

Since the difference between the equivalents of the common fatty acids are not large, these considerations are perhaps of little or no importance in so far as concerns the consumption of soap in household economy—the total amount used in a single family being but small. In a manufacturing establishment, however, where fifty or a hundred thousand pounds of soap may be used in the course of a year, differences which cannot be deemed insignificant must exhibit themselves.

For example, the equivalent weights of several soaps (regarded as anhydrous), in common use, are as follows:

Oleic acid (red oil) soap,	= 3800.95
Palm oil “	= 3588.85
Tallow “	= 3300.95
Cocoa-nut oil “	= 3065.45

Calculating from these weights how much of each of the other soaps would be required to replace 1000 pounds of tallow soap, the following quantities will be found:

Pounds of	Per cent.
1151 oleic acid soap, <i>i.e.</i> ,	15.1 more than tallow soap.
1087 palm oil “ <i>i.e.</i> ,	8.7 “ “ “
928 cocoa-nut oil “ <i>i.e.</i> ,	7.2 less than “ “

Differences like these must certainly be of importance in

practice; and could, doubtless, be detected by direct experiment, if any one would undertake a comparison of the various kinds of soap—a research which would not be easy, however.—*Chem. News, London, from Bættger's Polytechnisches Notizblatt.*

WOOD'S FUSIBLE METAL.

Lipowitz has made some experiments on the cadmium-alloy, described by Dr. Wood (see *Chemical News*, vol. ii. p. 257.) He found that an alloy composed of 8 parts lead, 15 parts bismuth, 4 parts tin, and 3 parts cadmium, possessed the following properties:—It is permanently silver white, and has a brilliant metallic lustre; it is not so brittle or hard but that it may be obtained in thin leaves or flexible plates: it has a fine-grained fracture, and may be filed without stopping up the file. In dry air it keeps its polish. It expands in cooling, but not so much as bismuth or antimony. Its specific gravity is from 9.4 to 9.41. It softens between 131° and 140° Fahr., and near 140° becomes perfectly fluid. No change in the condition of the metallic mass was observed on remelting after rapidly cooling the alloy. The above properties show that the alloy may be applied to some useful purposes. It may supersede all the quicksilver alloys for stopping teeth: it may be used as a solder whenever the metals soldered are not likely to be exposed to heat. Tin, lead, and Britannia-metal may be soldered together under water above 160° Fahr. Zinc, iron, copper and brass may also be soldered with the greatest ease under water, to which a little hydrochloric acid has been previously added. The alloy is so easily fusible that it may be melted on a piece of paper over a spirit lamp. In the preparation of the alloy the author recommends the use of the purest bismuth.—*Chem. News, London, from Dingler's Polytech. Journ.*

THE SPONGE FISHERY OF THE BAHAMAS.

BY P. L. SIMMONDS.

In our first number, [see page 28 of this volume], we gave an account of the sponge fishery of the Ottoman Archipelago, from

which the finer descriptions of sponge are obtained. The coarser descriptions entering into commerce are procured about the Bahama banks and the coast of Florida. From 1000 to 1500 bales of sponge of 300 lbs. each are shipped from Nassau, New Providence, annually.

Sponge fishing is said to have become a very profitable business in the neighborhood of Key West, Florida. About 100,000 lbs. are reported to have been gathered during last year, and the sales amounted to 25,000 dollars. The article is mostly procured by natives of the Bahamas. This is a new branch of business for Key West, and was formerly confined to the Mediterranean. The finer quality of sponge is not found on the American coasts, although the coarse description is abundant all about the coast of Florida and the Bahama banks.

The principal supply of West India sponge comes from the Bahama Islands. The rapid strides made in sponging within this group since 1847 appears almost incredible. Although the trade has been carried on for years, a Mr. Hayman was, I am informed the first who gave it an impetus. About the streets and outskirts of Nassau, New Providence, vast quantities of sponge may be seen covering fences, yards, and housetops, where it is left to dry, after having been previously buried (in order to kill the zoophyte which inhabits it) and washed. It is afterwards divested of the fragments of rock which adhere to it, pressed, and packed in bales, averaging 300 lbs. weight each, for the London market, where it is manufactured into cloth, hats, &c., and converted to many useful purposes. The value of sponge in surgery and for domestic uses is well known. Spongio-piline has recently become the medium for applying poultices to wounds instead of cloth.

To show the importance of the sponge trade in the Bahamas, I may add the following statistics, with which I have been favored by a gentleman engaged in shipping large quantities. "From Jan. 1 to June 30, 1850, there were exported from Nassau nearly 1000 bales of sponge, of the value of at least £5 per bale = £5000. On Jan. 1 a very small stock of sponge was on hand, while on June 30 every dealer in this article had a large stock; therefore, as it is a cash article, there must have been paid to the crews employed in this trade at least

£8000." The value of the sponge exported from the Bahamas in 1852 was about £12,000.

The sponge trade of the Bahamas is in a very flourishing condition. The total value exported in 1849 was but £2,217; in 1850, £5,700; in 1851, £14,900; in 1852, £11,257. In later years the quantity of sponge exported from the Bahamas has been:—

	Cwts.	Value.
1855	2399	£9,615
1856	1800	6,723
1857	2657	11,025
1858	3357	17,258

A great deal of this goes to the United States.

The Andros Islands and the Cays are the great sponging districts. The sponge is usually found in grassy and rocky patches near the shores of this group. Crawls for cleaning these may be seen from Joulters to Jonas Cays, constructed with stakes about two inches thick, into the mud, and forming a square of twelve feet, sufficiently high to prevent the sponge washing out. In these the sponge is soaked and washed frequently, after having been buried in sand about a week or ten days, when it loses the black animal matter, which has an offensive smell. When first gathered, the pieces are wrenched from the rocks with a strong two-pronged fork fixed to a long pole. The sponges are of four kinds—yellow, glove, velvet, and mop. The first is the most valuable kind, selling at about 1s. the lb.; the second at 9d.; the velvet is the toughest, and much used in stables for its softness; the last kind is very inferior, and only used for mops. At the foregoing prices it scarcely repays the outfit, but 1s. 3d. a pound about remunerates the fishermen.

The imports of sponge from the Bahamas and United States during the past seven years have been as follows, in pounds:

	Bahamas.	United States.
1853	91,736	23,774
1854	115,213	33,159
1855	120,013	14,936
1856	79,893	3,271
1857	167,051	—
1858	226,094	7,693
1859	207,450	7,234

Lon. Pharm. Journ. May, 1861, from The Technologist.

TOUCHING LINT.

Liebig, in one of his delightful letters on Chemistry, affirms that the quantity of soap consumed by a nation would be no inaccurate measure whereby to estimate its wealth and civilization. From the consumption of lint we may, with the same certainty, deduce important conclusions respecting the magnitude and severity of a nation's battles. In a letter which appears in another part of this journal, the effect of the American conflict on the trade in lint is touched upon, and some interesting details respecting the various kinds of lint now in the market are given. As the war fever is raging at the present time, and as the demand for lint daily increases, I take the opportunity for saying a few words about this important product.

Lint was formerly prepared from old linen rags by a process which I shall presently describe. The machine-made lint now generally used invariably contains a portion of cotton; and the variety known as cotton-lint—the term is an etymological contradiction—is formed exclusively of this fibre. Flax, which consists of woody fibre, is procured from the inner bark of the stalk of *Linum usitatissimum* by the process of steeping and stripping off the bark. Under the microscope the fibres are readily distinguished from cotton, being round and attenuated to a point at each end. Cotton is composed of the hairs surrounding the seeds of various species of *Gossypium*. These hairs when dry exhibit under the microscope a peculiar twisted appearance. The quality of cotton depends on the length, strength, and firmness of the tissue, or, as it is called, the *staple*. For the preparation of lint, long-stapled cotton at about 10*d.* the pound is required.

Flax lint is more cooling to a wound than that made from cotton, as it conducts heat more readily. For the same reason a linen shirt is cooler than a calico one. Flax lint has other points of superiority; it is much softer in fibre than the cotton fabric, and its absorbing power is greater. For many purposes, however, cotton-lint may be profitably substituted for the more costly product. Although it is not liked by the surgical profession, most pharmacists use it in unimportant cases. For wrapping round dental instruments and similar purposes, it is nowise inferior to the best flax lint.

Lint made from linen rags is now seldom seen, though many eminent practitioners prefer it to that made by steam-worked machinery. Six years ago the scraped-linen lint was in general use, and a sad outcry was raised against the patent fabric which had then been but recently introduced. The wholesale lint manufacturer of that day looked to the Jews for a supply of linen rags applicable to his purposes. For these rags he generally paid an exorbitant price. To prepare them for the operative lint-maker, who was invariably a female, the seams had to be cut out, and the ragged and threadbare portions removed. The average loss in weight from this operation amounted to nearly twelve per cent. upon ordinary rags, and to about half that on old sheeting and linen of an analogous description. The rags were then washed thoroughly clean, and cut to the width of the linting machine. Before describing the process of linting, I must call attention to the peculiar structure of the article which it produced. If the reader will take a piece of the old-fashioned lint in his hand, he will find, on endeavoring to pull it to pieces, that he can do so with the utmost ease in one direction, but not in another. On examining it in a strong light he will see the reason of this. All the threads which run in one direction are but very slightly frayed or scraped, and remain nearly as strong as when they came from the loom; but the threads which run cross wise are reduced to hairs of infinitesimal thinness—though none are cut through—the rest of their substance being raised into a soft “fluff,” which constitutes the lint. The process by which this result was attained has been thus described by a writer in *Chambers' Journal*, to whom we are indebted for several of the preceding facts:—

“On visiting the lint-maker at her work, we find her seated in a lofty attic of a dingy house in a back street not far from the bank of the Thames, where the river runs towards Lime-house. In order to get at her apartment, we have to pass through a series of hanging gardens of damp rags, for the most part less than a foot square in size, and which, having been washed clean, are hung out to dry upon the staircase and landing, the weather being ‘mizzly’ out of doors. From such a manifold demonstration, we conclude that the lint-maker we have come to visit, by introduction of a friend who employs her, if she works for the

middleman, works also on her own account, and cultivates a connection. On entering the room, we find her seated in front of the linting-machine, a rude and primitive instrument, about the size of the stool of a banker's clerk, and not a whit more ingenious in its construction. The affair is just the shabbiest of all shabby contrivances for bringing the edge of a sharp blade, about fifteen inches in width, to bear upon a little platform beneath. There is a kind of treadle worked by the foot, which assists the hands of the manipulator in using the knife. Upon the flat surface of the little platform is stretched the rag, or that portion of it undergoing the operation which has to be linted. A simple contrivance keeps the rag partially strained. As the knife hangs in its frame over the cloth, its edge is parallel with one line of the threads, and, of course, perpendicular to the other line. Several of these machines are at work in the room, and the blades are rising and falling with a dull, thumping, scraping sound continually. As the blade descends, it cannot much injure the threads whose course is parallel with itself, for obvious reasons; but it would, being very sharp, cut through the others were it allowed to descend with sufficient force. The force of the decent, however, is regulated by the dexterity of the worker, so that it shall only partly sever the cross-threads; and at every fall, while the knife is down, and its edge imbedded in the partly severed threads, the blade is forcibly shifted in the direction of those threads for a certain small space. It is this horizontal shifting of the sharp and heavy blade of the knife upon the strained rag while it is half cut through, which, by disintegrating those threads that cross the blade at the right angle, and raising nine-tenths or more of their entire substance into a soft woolly pile, produces the lint. It is worthy of remark, that the threads which, lying horizontally with the knife, escape serious injury by the process, render an important service by preventing the disintegrated pile from being detached from the surface of the rag by the violent passage of the blade."

The preparation of lint by steam power has been made the subject of several patents since the above description was written. A suitable fabric is now woven expressly for the lint manufacturer in lengths of 100 yards. This forms the raw material, and takes the place of linen rags. Having been imperfectly

bleached, it is sent to the lint-maker, who completes the bleaching, and extracts impurities consisting chiefly of lime and the bleaching agents left in the texture. The cloth is then stoved and wound on rollers ready for the linting process. In the best machines, the pile or nap is raised upon the cloth by knives making upwards of 500 strokes a minute. The motion of these knives or scrapers is rotary in some machines and vertical in others. The latter motion is stated to be practically the best, as the knives moving vertically beat and soften the cloth upon which they raise the pile. A good machine will produce about eighteen yards or two pounds of lint per hour. The fabric after leaving the machine is passed through the calender and mechanically divided into pounds. It is then rolled and labelled ready for use.

After having compared several specimens of the new lint with the almost obsolete rag-lints, I am at a loss to account for the prejudice which still exists against the former. The machine-made lints possess all the valuable quantities of the older products, are much cheaper, and are sold in regular pieces, which can be cut up without waste. There are certain people who invariably cavil at all improvements, which they scornfully term "new-fangled notions;" and I cannot help thinking that the objections which have been raised against the machine-made lints proceed from some of these lovers of the past.—*Chemist and Druggist*, May 15, 1861.

A SUPPOSED NEW ELEMENT, PROBABLY OF THE SULPHUR GROUP.

Whilst examining the residues left in the purification of crude selenium from a seleniferous deposit, from a sulphuric acid manufactory, for *tellurium*, by the method of spectrum analysis, Mr. Crookes observed a *bright green* line suddenly to appear and disappear under circumstances which led him to the conclusion that a hitherto unrecognized element was present, the isolation of which is now engaging his attention. As far as he has gone, the following appear to be the properties of this new substance, both in solution and in the dry state: 1. It is completely vola-

tile below a red heat, both in the elementary state and in combination (except when united with a heavy fixed metal). 2. From its hydrochloric solution it is readily precipitated by metallic zinc, in the form of a heavy black powder, insoluble in the acid liquid. 3. Ammonia added very gradually until in slight excess to its acid solution gives no precipitate or coloration whatever, neither does the addition of carbonate or oxalate of ammonia to this alkaline solution. 4. Dry chlorine passed over it at a dull red heat unites with it, forming readily volatile chloride, soluble in water. 5. Sulphuretted hydrogen passed through its hydrochloric solution precipitates it incompletely, unless only a trace of free acid is present; but in an alkaline solution an immediate precipitation of a heavy black powder takes place. 6. Fused with carbonate of soda and nitre, it becomes soluble in water; hydrochloric acid added in excess to this liquid producing a solution which answers to the above tests, 2, 3, and 5. The smallest trace of this substance, whatever it may prove to be, introduced into the burner of the spectrum apparatus gives rise to a brilliant green line, perfectly sharp and well defined upon a black ground, and almost rivaling the *sodium* line in brilliancy. It is not, however, very lasting, owing to its volatility, which is almost as great as selenium, a portion introduced at once into a flame merely shows the line as a brilliant flash, remaining only a fraction of a second; but if it be introduced into a flame gradually, the line continues present for a much longer time. The elements amongst which alone it must occur, if not really new, are antimony, arsenic, osmium, selenium, and tellurium; these and their compounds have been rigidly scrutinized in the spectrum, by Mr. Crookes, without exhibiting a trace of the green line characteristic of the substance in question.—*Chemist and Druggist*, May 15, 1861.

EFFECT OF OXALATE OF AMMONIA UPON THE PRECIPITATION OF PRUSSIAN BLUE.

By A. DUNCAN, Jr.

On repeating the experiment of Professor Arnandon on the influence of oxalate of ammonia in modifying the action of prussiate of potash on a salt of peroxide of iron, by which the pre-

precipitation of Prussian blue is prevented, I found that not only was this the case, but also that if the Prussian blue were first precipitated, the addition of oxalate of ammonia caused it to redissolve. I therefore prepared a quantity of Prussian blue, which was well washed by decantation, and afterwards on a filter. A saturated solution of oxalate of ammonia dissolved a considerable quantity of it by the aid of heat, and yielded a clear greenish-blue solution. On being evaporated and set aside, numerous crystals of oxalate of ammonia were formed, but at the same time, at the *edges* of the solution, were minute dark blue crystals, of which a larger quantity was obtained by evaporating the mother liquor. They were quite soluble in water, and the addition of a drop of acid caused a copious precipitate of Prussian blue. The quantity I obtained altogether, however, was not large enough to enable me to experiment further upon it, but I am preparing the solution on a larger scale for that purpose.—*Chem. News, London, Feb. 9, 1861.*

WHAT TO OBSERVE IN LICHENS.

There are no plants so variable in character as the lichens; none in which it is consequently so difficult to decide what are species and what are varieties. In order to a comprehensive knowledge of species, it is necessary to study individuals in every condition of growth and from every possible habitat. Hence, the commonest species and varieties become of value—the more so if collected in countries comparatively unexplored botanically, for lichens are no exceptions to the rule that geographical differences are attended by corresponding differences in the characters of the same plants. Every collector of lichens—however common and well-known the latter may be—may therefore consider himself as contributing towards a more scientific and philosophical, because more comprehensive, knowledge of a very Protean, but interesting, group of plants. If the collector make a point of gathering specimens of everything he meets which belongs to the lichen family, he will run a good chance of including some novelties, perhaps new species or varieties. New species are most likely to be met with among the very minute crustaceous

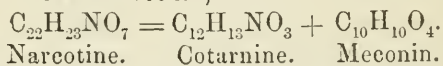
lichens which grow on rocks or trees, and which cannot be properly studied without the aid of the microscope; among species, belonging, for instance, to such genera as *Lecidea*, *Lecanora*, *Grophis*, *Opegropha*, *Calicium*. It is not to be expected that the tyro should make these microscopical examinations or discoveries for himself: he will probably require the assistance of some experienced microscopist or lichenologist. The applications of lichens to the arts are daily becoming more numerous and important. New dye-lichens are being discovered in India and the East. Again recently the probability has been shown, on good ground, that a lichen—the *Lecanora esculenta* of Pallas—was the Manna of the Bible. The colorific capability of a lichen, so far as regards a red or purple dye of the nature of orchill or cudbear, may be readily discovered by simply macerating the lichen—chopped into small fragments or pulverised according to the nature of its thallus—in a weakish solution of liquor ammonia—allowing the mixture to stand a few days in a warm part of the house, and shaking it frequently, so as to expose the mass to the action of the air. The colorific capability of a lichen, so far as regards other colors—chiefly brown and yellow—may be easily ascertained by simply boiling the lichen, chopped or pulverized as before, in a small quantity of water. Whether and how much mucilage or starch a lichen contains may be ascertained by the same means as last mentioned, and allowing the mixture to cool, when it will gelatinize more or less, if it contain much mucilage. Lichens are very easily collected and transported; they require no sort of preparation; they may be simply allowed to dry in the open air and packed as convenient. Those growing on trees generally require the piece of bark on which they grow to be sliced off with a knife, and those on stones the piece of rock to be broken with a hammer. Both may be wrapped in paper like mineralogical specimens. In all cases the localities and dates of collection should be mentioned, and any further information as to uses, &c., which may be known to the collector.—*Dr. W. Lauder Lindsay, in Chem. News, London, March 30, 1861.*

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CHEMICAL CONSTITUTION OF NARCOTINE, AND OF ITS DECOMPOSITION.

By HENRY M. NOAD.

Messrs. Matthiessen and Foster have communicated to the Royal Society a preliminary notice of researches into this subject. They obtained from Mr. Morson a quantity of narcotine prepared with scrupulous care from the residues which had accumulated during the preparation of very large quantities of codeine and morphine from opium of various qualities and from various sources. The results of all their analyses agree best with the formula $C_{22}H_{23}NO_7$, differing slightly from that of Wöhler and Blyth, viz., $C_{23}H_{25}NO_7$. They operated on several pounds of narcotine, and observed nothing to warrant the announcement made by Wertheim and Hinterberger, that there probably exists several varieties of this base. To cotarnine, another base obtained by the oxidation of narcotine, they assign the formula $C_{12}H_{13}NO_3$. At present no *rational* formula can be assigned to narcotine, though, according to the formula adopted by the authors for it and cotarnine, it contains the elements of of the latter base and meconin, thus:—



Narcotine. Cotarnine. Meconin.

By distilling 20 grains of narcotine with concentrated hydriodic acid, 19 grains of pure iodide of methyl were obtained, a quantity which corresponds as nearly as could be expected with three atoms of iodide of methyl for one atom of narcotine. This base contains therefore three atoms of methyl so combined as to be easily separable; and it seemed to the authors very probable that when it is distilled with potash, according to the conditions of the experiment, sometimes pure ammonia, and at other times methylamine, CH_5N , dimethylamine, C_2H_7N , or trimethylamine, C_3H_9N , are produced.—*Chemist and Druggist*, May 15, 1861.

A NEW CANADIAN DYE.

Professor Lawson has prepared a new dye of great richness, in the Laboratory of Queen's College, Canada, from an insect a species of *Coccus*, found for the first time last summer on a tree

of the common black spruce (*Abies nigra*, Poir), in the neighborhood of Kingston. This new dye closely resembles true cochineal, a most expensive coloring matter capable of being produced in warm countries only, and which is used to give a fine and permanent dye in red, crimson and scarlets, to wool and silks. Unlike cochineal, the new dye, discovered at Kingston, is a native Canadian product, and capable of being produced in temperate countries. Having been but recently observed, a sufficient quantity has not yet been obtained for a complete series of experiments as to its nature and uses; but the habits of the insect as well as the properties of the dye, seem to indicate that it may become of practical importance. In color it closely resembles ordinary cochineal, having rather more the scarlet hue of the flowers of *Adonis autumnalis*, and no doubt other shades will be obtained. The true Mexican cochineal is now being cultivated in Teneriffe and other vine-growing countries of Europe and Africa, with such success as to displace the culture of the grape vine.—*Chem. News, London, March 30, 1861.*

BENZINE, (EUPION NAPHTHA.)

Benzine so called is a light eupion oil obtained in the manufacture of coal and petroleum oils for the purpose of illuminating, &c. It is an entirely different substance from the hydrocarbon benzole (sometimes called benzine) obtained by the distillation of coal tar; also by the distillation of benzoic acid with lime. True, benzole is a substance having a definite chemical composition and constant boiling point, which is not the case with the light oil above mentioned; it is a mixture of various hydrocarbons, differing in chemical composition and in their boiling points, some of which have a s. g. as low as .650, and increase from that point to .750. Oils having a gravity above the latter point are no longer fit to be used as benzine, as they do not evaporate rapidly, and then not without leaving a greasy stain. Large quantities of this substance, of late, have been used for the purpose of removing grease from clothing, &c. But the demand for it has not been in proportion to the supply; and some new uses should be discovered to utilize this product. One use of it, in particular, has suggested itself to me, namely, as a substitute for spirits of turpentine for painting. The high

price of turpentine, at present, presents a favorable opportunity for its introduction into use; and having used it, more less, for the last two years, in a small way, I would say that I have found it answer as well, if not better, than turpentine for paint, the thinning of varnishes, &c. The smell of it in paint is scarcely perceptible, and what there is dissipates in a much less time than that of spirits of turpentine; for inside-work in this respect I think it will be found preferable.

Besides the industrial uses above mentioned, this substance also has valuable solvent properties worthy the attention of pharmacutists. As a solvent of oils and resins it will be found in some instances superior to either alcohol or ether, and perhaps not so expensive as either of the other solvents; like them, it readily evaporates upon exposure or the application of gentle heat, and as it does not contain water, a handsomer preparation may be obtained by its use, and with less danger of deteriorating by the application of heat to expel traces of water, when either alcohol or ether is used.

It has been recommended in the *London Gardener's Chronicle* as the best substance for the destruction of insects on plants. One or two drops of it is said to be sufficient to asphyxiate the most redoubtable insect pest, be it beetle, cockchafer, spider, slug, catterpillar, or other creeping thing. A singular fact connected with this application of benzine, is that the bodies of insects killed by it become so rigid that their wings, legs, &c., will break rather than bend, if touched. Next day, however, when the benzine has evaporated, suppleness is restored.

As a therapeutic agent, this substance is not without value. It has been used with no little success as a topical application in rheumatic and neuralgic affections. The best method of applying it for this purpose, is to saturate a piece of cloth or paper with it; and bind to the part affected by several thicknesses of cloth, to prevent too rapid evaporation, and to continue the application as long as the patient can bear it. A short time after its application, a pricking, burning sensation will be experienced, which should be borne as long as possible, and the application then removed. The pricking soon subsides, and the application if necessary, should be again repeated. No vesication or eruption will be caused by its application; only a slight redness of the skin, which soon disappears.—*The Druggist*, June, 1861.

(Continued from page 281.)

While fractional distillation, or an evaporation undertaken at somewhat lower temperatures in a similar manner, is often the only means of separating volatile bodies which are neutral or indifferent, *the method of partial combination is a method of separating volatile bases or volatile acids from one another* when several bases or acids are present at the same time. How the volatile acids are to be separated from other volatile bodies, and likewise the bases from other volatile compounds, has been above set forth.

The method of partial combination was first used by Liebig in separating volatile acids. When we have prepared a fluid which contains the volatile acids separated from the other volatile constituents, and after it has been measured off in a graduated glass, it is divided into ten equal parts, one part of which is accurately saturated with a solution of soda or potash, and after the nine remaining parts have been added, the fluid is distilled. The distillate is thereon divided into nine equal parts, one part saturated with alkali, and the other eight parts added, and the whole again subjected to distillation. The distillate is now divided into eight parts, one part neutralized with alkali, the remaining seven parts mixed with this, and the fluid again distilled. In a similar way this proceeding is continued until only a tenth part of the original solution of acids remains in a free condition: consequently in this we have the weakest acid in a condition approximately pure; in the rest of the liquids the potash or soda salts of the other acids, in the first residue of the distillation the strongest acid either pure or contaminated with a little of the next weakest acid, and so forth. It is clear that, in a similar way, many volatile bases could be separated from one another. The only alteration required in the method given for acids would be that the neutralization of the parts of the fluid must be effected with dilute sulphuric acid or phosphoric acid instead of soda or potash. If in this way we have obtained ten parts of the soda or potash compounds of the acids, or even as many portions of the sulphuric acid or phosphoric acid compounds with the bases, we can procure, by the decomposition of the alkaline compounds with acids, or the salts of the bases with alkalies and distillation, the corresponding acids and bases in a free condition, and then be convinced whether we have had to do with two or more bases or acids. Of course there still remains the determination of the atomic weight and elementary analysis to afford a guide whether the individual acid portions or base portions require or not a further separation by the same method. On this subject I shall speak later in the treatise.

B.—Examination of the aqueous decoction.

We turn back to a closer examination of the watery decoction which was obtained by the treatment of the material under investigation with boiling water in the still at the same time with the watery distillate. It has been already mentioned that *by cooling of the hot fluid a separation often takes place of one or other substance*. If such a separation is observed, the separated body is removed by filtration for a closer examination, and

it is noticed whether a small portion of the fluid which has been filtered, by further evaporation and cooling throws out more of the bodies which were separated by the cooling of the original decoction. When this is the case, the filtered decoction is concentrated by evaporation, to obtain the principal bulk of such substances difficultly soluble in water. After collecting the substances on a filter, the filtrate is treated as the decoction would have been treated if nothing had separated by cooling.

Frequently the watery decoction contains a proportionately *large quantity of slimy substances*, which belong either to the group of *indifferent carbo-hydrates* or to the class of *pectine compounds*. By the presence of a great quantity of these bodies, the watery decoction is often so dense that, when cold, it is quite stringy. These substances, without exception, are insoluble in alcohol. But even when the decoction is not so dense, the precipitates obtained therefrom are mostly so voluminous and gelatinous that the fluid cannot be completely filtered from them, but is retained in the voluminous gelatinous flocks. In such cases these substances must be removed. For this purpose the decoction is concentrated by evaporation, and anhydrous alcohol is added to the still hot fluid as long as a bulky flocculent precipitate is thrown down. By filtration the fluid is separated from the precipitate. In many instances alcohol does not produce a flocculent precipitate, but it causes a considerable turbidity, and the precipitate deposits itself as a tenacious mass at the bottom, which is particularly the case when gum or an analogous body is precipitated by alcohol simultaneously with various salts of organic acids.

The spirituous fluid separated from the precipitate is subjected to distillation, which is stopped as soon as all the alcohol has passed over, and the liquid is free from it. This watery residue of the distillation is treated precisely as the original watery decoction, when no such gelatinous substances, or those rendering the fluid dense and tenacious, were precipitated by alcohol therefrom.

This treatment is as follows:—The watery decoction is divided into several parts. *To one part of the watery decoction is added* a concentrated cold aqueous solution of *acetate of lead*, as long as a precipitate is thereby produced. The precipitate is brought on a filter and washed well with water. The liquid filtered from the precipitate is mixed with subacetate of lead as long as anything is thrown down. This precipitate is likewise collected on a filter and washed with water. The filtrate is freed from the lead contained therein by a stream of sulphuretted hydrogen, separated from the sulphuret of lead by a filter, and the sulphuretted hydrogen expelled by heating the filtrate. The sulphuret of lead is exhausted with hot water, and when this takes nothing up it is treated with hot alcohol, and the hot filtered solution is concentrated in a water-bath. Frequently bodies which are retained by the sulphuret of lead crystallize out after long standing from the concentrated aqueous or alcoholic extract. *The fluid precipitated with acetate of lead and subacetate of lead, freed from lead*

by sulphuretted hydrogen, and filtered from sulphuret of lead, is, after the expulsion of the sulphuretted hydrogen, concentrated by evaporation until the residue has a thin syrupy consistence. A small portion of this residue is examined, to learn whether the addition of alcohol precipitates substances or not. If by the addition of alcohol at ordinary temperatures, or after heating in a water-bath, a precipitate is developed, the whole residue is treated with alcohol, and the alcoholic liquid filtered from the precipitate. It is then ascertained whether the *alcoholic fluid* from the precipitate when such was obtained gives or not a precipitate on the addition of ether. In this case frequently a precipitate results of a semi-fluid character. Sugar, which often exists in parts of plants, is separated by treatment with ether. The precipitate sometimes formed by alcohol is dissolved in the smallest possible quantity of water, and it is observed whether by long standing crystals separate or not. Exactly in the same manner, the precipitate caused by ether is treated. From the fluid containing ether and alcohol by a gentle heat the ether as well as the alcohol is expelled, and the watery residue reserved to observe if crystals form therein or not.

These are the examinations which are performed with a portion of the fluid which has been obtained by the treatment of the watery decoction with sugar of lead, subacetate of lead, and sulphuretted hydrogen.

Another portion of this fluid, after a suitable concentration, is allowed to stand for a long time, to ascertain whether crystals will form or not therein. Frequently a separation of crystals takes place in greater or less quantity. If such crystals form, they are separated from the dense mother liquor by a moist linen filter on a glass funnel. The upper part of the filter is afterwards closed by means of a thread, and laid between bibulous paper, and pressed upon by a small board with weights, which are gradually increased to increase the pressure. The mother liquid separated from the crystals contains, besides other bodies, always a greater or less quantity of the crystalline substance, according to its degree of solubility, which, upon a closer examination of the mother liquid, must be taken into account. This closer examination will be spoken of further on.

A second portion of the watery decoction is treated with animal charcoal. A glass tube, about half an inch wide and eight or ten inches long, is taken, which should be drawn to a point at one end. The mouth of the point must be about the size of a hempseed. Into the wide end of the tube a piece of loose cotton wool is introduced and pushed into the pointed end of the tube, which is fastened vertically in a clamp, with the narrow mouth downwards. The tube is filled six or seven inches high with pure animal charcoal, and the watery decoction is poured in by the aid of a small funnel inserted in the upper mouth of the tube. The fluid, as it passes through the tube into a glass flask, is replaced in the same manner by a fresh portion. Coloring and bitter principles are taken up frequently by the animal charcoal from the watery decoction, so that the color and the taste of the escaping fluid are often very different from the color and

the taste of the original liquid. When the quantity of fluid set apart for the experiment has run through the charcoal, and this fluid has been removed, the charcoal is washed with cold water, to completely separate the bodies which are not retained by the charcoal. The charcoal is transferred to a vessel suitable for boiling, and boiled with *strong alcohol*. The spirit is filtered hot from the charcoal by means of a hot-water funnel, and the decoction with alcohol repeated as long as this takes up anything. The spirituous solutions are concentrated by distilling off the greatest part of the alcohol, and the concentrated extract (the residue of the distillation) is allowed to stand, to ascertain whether crystals form or not therein. Should crystals not separate by long standing, the residue is dissolved in water and further examined. On the contrary, should crystals form, they are first separated from the mother liquor, and these, as well as the mother liquor, subjected to a closer examination. *The liquid treated with animal charcoal* is treated precisely as the first portion of watery decoction.

A third portion of the watery decoction is mixed with a solution of alum, and then ammonia is added to the fluid. If a precipitate results thereby, the alumina exists therein, partly as a hydrate, partly combined with one or more organic substances. The precipitate is removed by filtration, and washed on the filter with water. To the filtrate so much dilute sulphuric acid is added as will almost neutralize the whole quantity of free ammonia which has been added in excess. The residue of ammonia is saturated with a few drops of acetic acid, the neutralized fluid is evaporated to a small volume, and the residue mixed with anhydrous alcohol. This precipitates a considerable quantity of sulphates of potash and ammonia, which should be removed from the alcoholic solution by filtration. From this solution the alcohol is distilled off, and the syrupy residue again treated with hot anhydrous alcohol, which separates the rest of the sulphates, sometimes mixed with more or less organic matter insoluble in alcohol. This alcoholic solution is likewise freed from the greatest part of its alcohol by distillation, and the residue set aside, by which crystals are frequently separated; the crystals and the mother liquor are separated, and submitted to a closer investigation. When no crystals are formed, the whole residue is subjected to investigation.

We return now to both *the precipitates* which were produced by *sugar of lead and subacetate of lead* in the first part of the aqueous decoction. As before remarked, the second part of the watery decoction, after treatment with animal charcoal, is precipitated with sugar of lead and subacetate of lead exactly in the same way as the first part of the watery decoction not treated with animal charcoal. If the animal charcoal has not taken up and retained any substances from the watery solution, it is self-evident that the precipitates obtained by sugar of lead and subacetate of lead in the portion of the watery decoction treated with animal charcoal, have quite the same composition as the corresponding precipitates from the first part of the decoction which was not treated with animal charcoal. In this case, the

corresponding precipitates can be united with one another, and, as a whole, be employed for examination, which must not be done when the animal charcoal has separated any substances. In the latter instance the precipitates are separately examined with regard to their composition, and in the same way.

The precipitate produced by sugar of lead is extracted with alcohol when a small portion has shown that it is partially soluble in alcohol. If the alcohol dissolves nothing, a small portion is tried with spirit of specific gravity .825, to ascertain whether that effects a partial solution. If the *alcohol or spirit* has partially dissolved the precipitate, the *insoluble* is separated from the *dissolved part* by a filter. The lead compounds of sulphuric and phosphoric acids, as well as those of oxalic acid and many other organic acids frequently present, do not dissolve in alcohol or spirit. On the contrary, there is a great number of substances which form compounds with lead insoluble in water, but soluble in alcohol and weaker spirit. The *alcoholic* solution is decomposed by a stream of sulphuretted hydrogen, and then filtered; the sulphuret of lead is washed on the filter with anhydrous alcohol as long as anything is taken up, afterwards the sulphuret of lead is treated with water on the filter, as it often happens that a substance quite or almost insoluble in anhydrous spirit is contained in the sulphuret of lead which dissolves in water, and can be thus extracted. By evaporation the filtrate spirituous as well as aqueous is reduced to a small volume, and this residue set aside to afford an opportunity for crystals to form: which sometimes happens when crystallizable substances are present.

The part of the precipitate thrown down by sugar of lead from the watery decoction, and insoluble in alcohol or spirit, is, after having been washed with alcohol or weaker spirit, formed with water into a thick smooth paste, and a small portion of this paste is mixed with a great excess of *acetic acid*. It is observed whether the whole or a part of the precipitate disappears. Sometimes very little or nothing dissolves in the acetic acid. When a partial or complete solution is noticed, the whole quantity of the precipitate, mixed with water, is treated with acetic acid as long as a decrease of the precipitate results. Now, either a complete solution is obtained, or in the resulting solution an insoluble portion is suspended. In the latter case the solution is filtered from the undissolved portion. Either this filtered solution, or the entire liquid when all the precipitate dissolves in the acetic acid, is mixed with subacetate of lead in a very concentrated condition. With continued agitation small quantities of the subacetate of lead are added. It often happens that a precipitate forms after a very small quantity of the subacetate of lead has been added, although the fluid is still strongly acid. After this precipitate has been removed by a filter, much subacetate of lead can be added before a fresh precipitate forms, which first appears when the free acetic acid has been neutralized by the subacetate of lead. If a second precipitate ensues by the addition of much subacetate of lead, this is collected on a filter by itself. Both precipitates which are thrown down

from the acetic acid solution, or the precipitate when only one results, must be purified by washing with water on the filter, then distributed in water to be decomposed with sulphuretted hydrogen. The fluid is separated from the sulphuret of lead by filtration, and the excess of sulphuretted hydrogen expelled. This expulsion is most conveniently effected in a glass flask, or in a tubulated retort, in a water or chloride of calcium bath. Carbonic acid gas should be driven through the fluid to displace the air in the retort or flask, and prevent the decomposition of the sulphuretted hydrogen accompanied by the separation of sulphur. Heat must not be applied to the apparatus until all the air is displaced by carbonic acid gas. *The precipitate* which is produced by *subacetate of lead* in the fluid which was filtered from the precipitate which sugar of lead occasioned in the *watery decoction*, is likewise examined with reference to its solubility in alcohol and in weaker spirit, wherein it may be partially or quite soluble, or quite insoluble. *The precipitates soluble in alcohol or spirit, and those insoluble therein*, are treated in precisely the same manner as directed for the precipitates derived by sugar of lead from the watery decoction. The precipitate resulting from sugar of lead is manifestly always completely soluble in acetic acid. In many cases, indeed, a number of substances are entirely thrown down from the watery decoction by sugar of lead, so that the precipitate formed by subacetate of lead contains none of the substances which are contained in the precipitate produced by sugar of lead. But these favorable instances of complete separation are only exceptions to the rule. Mostly the precipitate obtained by subacetate of lead contains substances which were contained in the first precipitate—namely, in that part of the first precipitate by sugar of lead which dissolved in acetic acid, and was again thrown down by subacetate of lead from this acid solution.

It is here particularly necessary to draw attention to a circumstance, namely, *to the presence of bodies in the precipitates produced by subacetate of lead*, which are not contained in *these precipitates* in the form of lead compounds, but are in *a free condition*. Let it be assumed that the watery decoction contains an organic base very difficultly soluble in water in the form of a salt soluble in water, whose acid produces with oxide of lead a compound insoluble in water, it will be evident that the acid of this salt will be contained in the precipitate resulting from sugar of lead, and the base of this salt will be found as an acetate in the filtered watery solution. If this fluid is neutralized with subacetate of lead, a weak base can be thereby separated from the acetic acid, and is precipitated in water on account of its insolubility in conjunction with the different lead compounds formed. Bodies admixed with precipitates of that kind which are produced by subacetate of lead, generally dissolve in alcohol, especially when heated. They are in this way often easily obtained pure when the lead compounds in these precipitates are insoluble in alcohol, or possess a very slight solubility in that menstruum. What has been stated explains the peculiarity sometimes existing of a precipitate resulting from subacetate of lead dis-

solving partially in alcohol or spirit, without more than a trace of lead being detectable in the solution.

If acetate and subacetate of lead have produced two precipitates, if these have been divided into two parts by strong or weaker alcohol, if that portion of the sugar of lead precipitate, which is insoluble in alcohol, has again been divided into a portion soluble and another one insoluble in water containing acetic acid, and if all these portions have been freed from lead by sulphuretted hydrogen; then these substances thus freed from lead, as well as the different portions of sulphuret of lead, must be further examined.

For this purpose, the *various portions of the sulphuret of lead* are treated immediately, after being washed, first with *boiling water* and then with *boiling spirit*, to ascertain whether these fluids extract anything from the sulphuret of lead. After the sulphuret of lead has been exhausted with water and spirit, it is exhausted with *dilute aqueous ammonia*, and the filtered ammoniacal solution is completely neutralized with acetic acid. The oxidation products of tannin and analogous colored substances are often in this way extracted by the water containing ammonia from the sulphuret of lead, and precipitated from their solutions by acetic acid.

It is self-evident that the various (portions of) substances free from lead, which are obtained from those portions of the precipitates by acetate and subacetate of lead insoluble and soluble in strong or weaker alcohol, and from those portions of the sugar of lead precipitate insoluble in alcohol, which are soluble and insoluble in acetic acid, may still be a mixture of several bodies. To ascertain this, the individual parts, separated according to the directions above given, are further investigated by *fractional precipitation* with regard to their homogeneousness. It is scarcely necessary to mention that bodies which have been separated in a crystalline form by the standing of the fluids, properly evaporated in the air or in exsiccator, must be previously removed from the mother liquors, and that in an such cases the diluted mother liquors must be submitted to examination by fractional precipitation.

For *fractional precipitation*, the two lead salts, *sugar of lead* and *subacetate of lead* are employed, which served for separating up to a certain point, as previously described. The fluids which afford no precipitate with sugar of lead are treated with subacetate of lead. *Fractional precipitation* is conducted in the following way:—The whole quantity of the fluid to be examined is measured in a graduated glass to estimate its volume, and then it is ascertained how much of a certain solution of sugar of lead or subacetate of lead is required by volume to completely precipitate the fluid. With this object, a small portion of the fluid to be examined is taken before it is measured off, and exactly neutralized with ammonia. If the quantity of solution of sugar of lead or of subacetate of lead is known which is required to precipitate the whole quantity of the fluid, the whole quantity,

after exact neutralization with ammonia, is mixed with a tenth part of the quantity of solution of sugar of lead or subacetate of lead which would be required for its entire precipitation. The precipitate is filtered off, and the second tenth of the solution of sugar of lead or subacetate of lead is added to the filtrate, whereon the precipitate is again collected on a filter. This process is continued until ten precipitates are obtained from the fluid, all of which are washed with water, diffused in the same medium, and decomposed with sulphuretted hydrogen, whereby ten parts result from the fluid, which are subjected to a more minute examination when the sulphuretted hydrogen has been driven off.

I have convinced myself that this fractional precipitation is not so suitable to effect the separation of various substances as another method, which I will call *fractional solution*. This is executed thus:—It is determined how much acetic acid is required to dissolve the whole quantity of a precipitate which has been diffused through water to a smooth paste. Now, if a tenth part of the acetic is added, a tenth part of the precipitate is dissolved. This solution is filtered off, the precipitate found on the filter is transferred to a beaker glass by means of a stream from a washing bottle, and then treated with the second tenth of the acetic acid, &c. The ten solutions are precipitated with subacetate of lead, the ten precipitates collected, each washed on a filter with water, diffused in water, and decomposed with sulphuretted hydrogen. The sulphuret of lead is separated by a filter, the excess of sulphuretted hydrogen expelled, and each of the ten fluids tested with reagents. It is evident that only lead compounds soluble in acetic acid can be in this manner treated, and not the parts of precipitates insoluble in that menstruum which are produced by sugar of lead in the watery decoctions, and remain undissolved by treatment with alcohol.

Before I pass to the examination of the precipitates which are produced in a portion of the watery decoction by alum and ammonia, I have still to mention the means by which a separation of the substances in some cases is effected, which are obtained from the precipitates developed by acetate and subacetate of lead, in a condition free from lead, according to the method previously given.

There are substances which, *per se*, or by the agency of other bodies with which they are mixed, are soluble in water in rather considerable quantity. *Many of the bodies lose their solubility in considerable degree when they are completely dried*, or then dissolve only very slowly in water; while drying, on many other bodies, exercises no influence of that kind on their solubility. Consequently it is often a good method, to obtain the greatest part of a substance in a state of separation from the other bodies accompanying it, to allow the mixture to thoroughly dry *in vacuo*; and best over sulphuric acid, to treat the dried mass with a little cold water, and then by stirring and trituration to bring the dried mass into close contact with

(To be continued.)

American Pharmaceutical Association.

NOTICE OF POSTPONEMENT.

In consequence of the disturbed condition of the country, correspondence and consultations have been had with members in various sections, and it is deemed advisable to postpone the meeting of the Association, which was to have been held at St. Louis in August of this year, until 1862.

Pursuant to the 1st Section of Article 5 of the Constitution, due notice will be given of the time and place for its next meeting.

It is earnestly recommended to *all* to keep in view the important interests of the Association—to the Committees to attend to their several duties, and especially to those members and others appointed at the meeting in New York, to whom was referred the investigation of special subjects, to be ready to report at the next meeting of the Association.

The objects of the Association and the conditions of membership are explained in the *First* and *Second Articles* of the Constitution, as published in the Proceedings of last year, and in the several Pharmaceutical Journals.

II. T. KIERSTED, *President*.

New York, June 12th, 1861.

Varieties.

On the Artificial Production of Alizarin.—M. Z. Roussin has announced to the French Academy, that he has succeeded in producing the beautiful natural coloring principle of Madder by artificial means, by acting on binitro-naphthalin by means of concentrated sulphuric acid and zinc. The author had not completed his analysis of the natural product in a pure state, but he has every reason to believe it will correspond with the artificial substance. The influence of this discovery on the art of dying, must be marked, as the binitro-naphthalin being a coal tar product can be produced to any extent. In our next we will introduce the details of the process.—*Comptes Rendus*.

Clay in Foreign Paper.—Professor Penny, of Glasgow, in a letter to the *Times*, of May 22d, gives the following results as obtained by him from a chemical examination of various kinds of foreign paper.

In several samples of British paper a notable quantity of sulphate of lime was found.

Paper.			Amount of Clay.
Creana-laid,	12 lb. per ream	. . . .	29 per cent.
do.	14 lb. "	. . . .	31 $\frac{1}{4}$ "
do.	16 lb. "	. . . .	33 $\frac{1}{2}$ "
do.	18 lb. "	. . . .	31 "
Demy printing,	16 lb. "	. . . .	26 "
do.	18 lb. "	. . . .	30 $\frac{3}{4}$ "
do.	20 lb. "	. . . .	29 "
Double-crown printing,	14 lb. per ream	. . . .	14 "
do.	18 lb. "	. . . .	18 "

London Pharm. Journ. June, 1861.

On the Acids of Benzoin.—It is a well known fact that the inferior kinds of benzoin—in brown or blackish masses—yield much more benzoic acid than the more valuable kind consisting chiefly of whitish tears. The cause of this seems to have been discovered by Kolbe and Lautemann, who announce (*Annal. der Chem. u. Pharm.*, cxv., 113,) that benzoin in tears contains little if any benzoic acid, but yields another acid, crystallizing entirely different from benzoic acid, melting easily on heating under water, and yielding oil of bitter almonds when treated with oxydizing agents, particularly permanganate of potassa. This acid appears to be identical with alphaltoluylic acid $C_{16}H_7O_3 + HO$ obtained by Möller and Strecker by acting on vulpinic acid (the peculiar yellow crystallizable acid of *Cetraria vulpina*) with baryta.—*Journ. and Trans. Md. Coll. Pharm. from Wiltst. Vierteljahrsschr.*

Rock Oil as Fuel for Steam Engines.—An application of the Rock-oil of Pennsylvania for generating steam for motive power under steam engine boilers is exciting attention in the oil region. The following is a description of the apparatus used:—A series of iron pipes are laid in the fire arch of the boiler, which pipes are perforated in their upper surface with minute holes: the oil is supplied to those pipes by means of a force pump, aided by an air receiver, to preserve a constant pressure. A spray, so to speak, of oil is thus made to fill the space usually filled by the flame of wood or coal used to raise steam: this, once ignited, fills the fire arch and flues of the boiler, and maintains the desirable amount of heat in the boiler. If this fuel is not found to be too expensive, it will prove a good thing for the use of steamers on sea voyages. Its practical use has been proved, and it remains for chemists and others to test it on ships, &c., in a large way. There can be but little doubt that this oil will be found cheaper than coal for gas-making for lighting dwellings, streets, &c.: its price, under the influence of the vast supply raised, will soon come down to a matter of 15 or 20 cents per gallon.—*Chem. News, London, May, 1861.*

Green Dye from the Rhamnus Catharticus.—M. Charvin has discovered in the *Rhamnus Catharticus* a green dye which seems to bear a great re-

semblance to the Chinese green Lo-kao. It is prepared in the following way:—The bark of the buckthorn is put into boiling water and after boiling some minutes, the contents of the vessel, bark and water together, are turned into an earthen pan, and covered up that they may cool slowly. After some days the liquid, which is of a brownish yellow color, is poured off, and clear lime water is added to it. It is then exposed in shallow dishes to air and light under the influence of which the color soon changes to green, and a deposit of the same tint settles in the dishes. Carbonate of potash is afterwards added, which produces a green precipitate, the fluid taking a dark brown color. When the precipitate has deposited, the fluid is poured off, and the precipitate collected on a filter and dried. Glénard in a report addressed to the Lyons Chamber of Commerce (*Bulletin de la Société d'Encourage.* November, 1860), has recommended the discoverer of this dye for the prize of 6000 francs offered by the chamber in 1857, for a color like the Chinese green extracted from a home plant.—*Chem. News, London, June, 1861.*

Capture of Whales by Means of Prussic Acid.—A very interesting paper has just been published by Professor Christison, the result of some experiments suggested as long ago as 1831 by Messrs. W. and G. Young, of Leith, for the capture of whales by means of poison, the agent being hydrocyanic, or prussic acid. This poison was contained in glass tubes, in quantity about two ounces. Among other difficulties, one was to discharge the poison from the glass tubes at the right time. After various trials, the plan fixed upon was to attach firmly to each side of the harpoon, near the blade, one end of a strong copper wire, the other end of which passed obliquely over the tube, thereby securing it in its place, then through an oblique hole in the shaft, close to the upper end of the tube, and, finally, to a bight in the rope, where it was firmly secured. By these means the rope could not be drawn tight, as it would when the harpoon attached to it struck the whale, without crushing the tubes: the poison would then enter the whale, and death ensue. The Messrs. Young accordingly sent a quantity of tubes charged with the poison by one of their ships engaged in the Greenland fishery, and on meeting with a fine whale the harpoon was skilfully and deeply buried in its body; the whale immediately “sounded,” or dived perpendicularly downwards, but in a very short time the rope relaxed, and the whale rose to the surface quite dead; but the men were so appalled by the terrific effect of the poisoned harpoon, that they declined to use any more of them. Subsequent experiments tend to convince the learned professor that success will be established in this method of capturing whales.—*London Pharm. Journ Aug. 1860.*

On the Density of Ice.—Considerable discrepancy exists between the numbers assigned by different experimenters as representing the sp. gr. of

ice. This discordance is probably due to the difficulty which exists in the way of adapting the ordinary methods of experiment to this body without introducing sources of error.

M. L. Dufour has endeavored to solve the problem, by finding a liquid in which the ice would float in equilibrium. By ascertaining the specific gravity of that liquid, the required result could of course be obtained. The fluid employed by M. L. Dufour consisted of a mixture of alcohol and water, cooled down to -8° or -10° Cent. At this low temperature the solution of the ice takes place with extreme slowness, a point which it is necessary to ensure. By employing the co-efficient of dilatation, the results are readily corrected to zero.

M. Dufour made twenty-four determinations, the results of which were comprised between 0.9162 and 0.9212, given a mean of 0.9175. Great care was of course necessary in the selection of the ice, to avoid the presence of air bubbles or impurity of any kind. M. Dufour used artificially frozen distilled water, which had been previously well boiled.—*London Pharm. Journ.* Oct. 1860.

Blistering Paper.—Take of Cantharidin, ʒj. ; White Wax, ʒj. : Olive Oil, ʒv. Melt together. With a brush, paint it over some white bibulous paper, and hang up to dry in a current of air. Take a piece of pink paper of the form and size required, the under colored side paint over with a weak solution of india-rubber ; cut the cantharidin paper the form and size (less a margin) of the pink paper, and while the india-rubber solution is still sticky place it on, and when dry roll it up. It is unaffected by damp, and blisters with certainty. Before applying, the blister should be held over the steam of hot water.—*London Pharm. Journ.* Oct. 1860.

Cement for Mending China, &c.—Take of isinglass two drachms, sprinkle it with water and allow it to stand until softened, then add as much proof spirit as will rather more than cover it, and dissolve with a moderate heat. Take of gum mastic one drachm, dissolve it in two or three drachms of rectified spirit. Mix the two solutions, and stir in one drachm of gum ammoniacum, previously reduced to a fine powder and rubbed down with a little water. Evaporate, if necessary, in a water-bath to a proper consistence. Keep the cement in a bottle. When required for use plunge the bottle in warm water, and apply the cement with a stick or small hard brush to the china previously warmed. Compress the pieces firmly together until cold, taking care to make the contact perfect, and using a very thin layer of cement. When properly applied, the cement is almost, if not quite, as strong as the china itself, unless exposed to the combined action of heat and moisture.

Another cement, useful for many purposes, may be made by dissolving isinglass in glacial acetic acid, and reducing it to the consistence of thin

jelly. It may be applied in the same manner as the above, but does not require to be warmed.—*The Druggist*.

Method of Preserving Cut Flowers.—Most persons are fond of preserving bouquets of natural flowers. Many methods of preservation have been proposed, but they have all more or less failed; the water in which they are placed becomes tainted, and is obliged to be changed at least once or twice a day, but even then the decay of the flowers, which begins very soon after their separation from the plant, is not materially prevented. The following method, which has completely succeeded, consists in putting a table-spoonful of powdered charcoal into the vase which contains the water destined to receive the flower or cut spray, and carefully placing the latter so that their lower extremities are beneath the liquid. This method has produced the most favorable results, for flowers may be thus preserved without any visible alteration—at least as long a time as in their natural condition—without the necessity of renewing the water or the charcoal.—*London Pharm. Journ.* May 1, 1861, from *Mémorial des Pyrénées*, and *Journal de Chimie Médicale*.

Camphor in Powder and Ointment.—Camphor may be very easily powdered by contusion in a large marble mortar, adding a small quantity of water, and passing it through a hair or silk sieve, according to the degree of fineness required. When powdered in this manner, the camphor never runs into lumps even when kept a long time. To make a good ointment:—Three parts of camphor so pulverized should be melted by aid of a bath in twelve parts of prepared lard; and the mixture, as soon as it begins to be a little cold, should be stirred from time to time until it entirely sets—thus preventing the granular crystallization always observed in ointments which are allowed to set without stirring. This ointment preserves its smoothness and consistence for a year after its preparation.—*London Pharm. Journ.* July, 1861, from *Journal de Chimie Méd.*

Tar and Copaiba.—M. Ricord has lately combined tar with copaiba in the treatment of gonorrhœa, this combination having been proposed by a pharmaceutical chemist to the Academy of Medicine. These substances are said to neutralize each other's noxious tastes, and the combination seems to prevent the sometimes unpleasant effects of the copaiba. The compound is administered in the form of capsules. Take 4 lb. 7 oz. of copaiba, 7 oz. of Norwegian tar, and 5 oz. of calcined magnesia, to make 4000 capsules. Dose 15 capsules per diem. The same surgeon also combines the copaiba with pepsine and bismuth, to prevent the drastic effects of the balsam. Take 5 lb. 7 oz. of copaiba, 1 lb. 3 oz. of neutral pepsine, 4 oz. of trisnitate of bismuth, and 6 oz. of calcined magnesia, to make 6000 capsules. Dose, from 15 to 18 per diem.—*Med. News*.

Editorial Department.

AMERICAN PHARMACEUTICAL ASSOCIATION.—By reference to the Announcement of President Kiersted at page 377, our readers will find that the Annual Meeting of the Association for 1861 has been postponed until 1862. This step has been taken only after much inquiry and reflection as to the best course to be pursued. A few were favorable to holding a meeting in one of the eastern cities, in order to keep up the regular annual publication, but by far the larger proportion of members approved of the postponement in accordance with the wishes of our St. Louis members. The Chairman of the Executive Committee feels at liberty to print the following document in support of the official announcement of the President:

St. Louis, May 23d, 1861.

Prof. WILLIAM PROCTER, JR.,

Chairman of the Executive Committee of the American Pharmaceutical Association.

Dear Sir:—In reply to yours of 19th May, respecting the opinion of members in St. Louis in regard to holding the meeting of the American Pharmaceutical Association in St. Louis in the month of August, 1861, we would most respectfully recommend that the Annual Meeting of the American Pharmaceutical Association, to be held in the city of St. Louis, in the month of August, 1861, be postponed until the year 1862, for the following reasons:

First—Believing St. Louis would be as acceptable to the majority of the many members as any other city, still we have reasons to believe that many would not attend, from the political troubles of the country.

Secondly—Believing that many of the members who have important reports to make, could not, under the excitement of the country, devote the time upon them that they otherwise would have been able to do, therefore the meeting would lack one of its most interesting features. And further, there will be but few of the members that can well afford the expenses in attending the Convention.

In view of the above, we would most respectfully petition the postponement of the meeting until 1862.

Most respectfully yours,

EUGENE L. MASSOT, Chairman.
THOS. KALB,
ENNO SANDER,
SAML. D. HENDEL,
THOMAS SCOTT,

Executive Committee of the St. Louis Pharmaceutical Association.

In the earnest hope that our political troubles will subside, we have coincided with our friends in this measure of postponement, although at

first the idea of breaking the regular succession of the meetings was unpleasant. But now that it has been decided, the question arises—what next? Will the hiatus thus created in the annals of the Association be unmarked by any evidence of progress? or will the members so far keep alive the interests of the Body as to attend to the several duties that devolve upon them for the present year, with such other labor as will naturally suggest itself, in the development of our professional interests abroad and at home?

We believe that every member who accepted a subject or subjects for investigation should early attend to the duty, so as to leave time for any additional labor that may offer. Volunteer papers should be numerous in an interval of two years, and should the progress of events favor the settlement of our national difficulties, so that the currents of our business and social relations may return to their wonted channels, we may look for many valuable contributions to our literature, not to speak of the pleasures of friendly intercourse renewed after so long a separation.

FLUID EXTRACT OF VANILLA.—The following recipe was produced at one of the Pharmaceutical Meetings of the Philadelphia College of Pharmacy, by Charles Shivers, and its publication was directed, as will be seen by the note appended by the Secretary, Dr. Pile, but by an accident it was mislaid, and being found too late for insertion in the beginning of the number, it is placed here:

Fluid Extract of Vanilla.

Take of Vanilla,
 Sand, (washed), each an ounce.
 Alcohol, 95°, three fluid ounces.
 Diluted Alcohol. q. s. to make a pint.
 Syrup, if desired, two ounces to the gallon.

Cut the Vanilla into short pieces, and bruise well with sand, then pack in a displacer, add first the strong alcohol, then the diluted alcohol, to make one pint. Let it stand for twenty-four hours, and filter.

Upon motion, the above was referred to the Publication Committee. The specimen I send you was left by Mr. Shivers for that purpose.

Yours truly,

W. H. PILE.

THE PHARMACOPOEIA OF 1860.—We have frequently received letters querying after the progress of the work of revision of our National Pharmacopœia, and in order to satisfy, as far as may be, the desires of our friends, we will remark that the Committee have occupied themselves continuously with the work, which has been performed with great care as far as they have gone. They are at present engaged in the important subject of the Extracts and Fluid Extracts. There is no probability that the book will be published until some time in 1862. With every disposition to hasten

the issue, the Committee find it impracticable to proceed more rapidly on the plan adopted, to avoid making the work sectional. Every local contribution towards the revision from colleges and societies, submitted to the National Convention at Washington, receives due consideration. The Committee meet three times a month, and the member from New York is almost always at his post, although it involves a journey of an hundred miles to effect it. We trust therefore that our pharmaceutical friends will not be uneasy at the delay which marks this laborious undertaking.

OUR SUBSCRIBERS AND THE MAIL.—In the distribution of this Journal we are met by difficulties, some of which are at present insurmountable. Among our subscribers are perhaps three or four hundred who are residents of the seceded States, into which the U. S. Mail has ceased to be carried, and no arrangement, so far as we know, has been made by which Southern subscribers to Northern Journals can be supplied. As this Journal is purely scientific and wholly disconnected with political objects, and solely humanitarian in its tendency, no possible objection can be urged against its circulation. The only question is how can those numerous subscribers at the South, many of whom have honorably paid up their subscriptions to the present volume, be supplied with the present and future issues? We have felt bound to assume the risk of printing as large an edition as of the previous numbers of this volume, and will retain those for Southern subscribers until some safe arrangement shall be made by the Postmaster General at Washington, by which such mail matter will be distributed at the South, and not sent to the "Dead Letter Office" as waste paper. Pharmacutists at the South who desire to continue subscribers, or who wish to receive the current volume, would do well to make interest with their own postal authorities, by which such mail matter can reach them through some of the Kentucky or other border Post Offices, to effect which it will be necessary to pre-pay the U. S. postage here to such points.

THE DRUGGIST, of Cincinnati.—The June number of this Journal commences the third volume of the work, and is, we perceive, published by William Doyle, and under the editorial superintendence of Edward S. Wayne, well known for his many contributions to pharmaceutical knowledge. Mr. Wayne pledges his best endeavors to keep his readers posted in the current information of the day pertaining to our profession. We shall, in common with many others, be pleased to hear through the columns of the *Druggist*, of the present condition and prospects of the grape culture and wine production in that region, including any new information in regard to the collection of American tartar.

THE
AMERICAN JOURNAL OF PHARMACY.

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SEPTEMBER, 1861.  
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ON THE CONVERSION OF MONOHYDRATED INTO COMMON
PHOSPHORIC ACID.

By J. M. MAISCH.

Since the investigations of Graham into the nature of phosphoric acid, and his important discovery of the three hydrates, which form three corresponding series of salts, no further researches appear to have been instituted. The standard works on chemistry contain scarcely anything beyond an abstract of the statements made by Graham about thirty years ago, and thus it happens that we know very little yet about the transition of one hydrate into another one. Starting with the phosphate of lime in bones and the common phosphate of soda, the pyrophosphate of soda and metaphosphoric acid have undoubtedly been often the subjects of experiments. What is known, however, of the reconversion of meta- and pyrophosphoric acid into the ordinary tribasic acid, is contained in the following paragraph of Graham's Elements of Chemistry: When solutions of the metaphosphate and pyrophosphate of water are warmed, they pass gradually into the state of common phosphate, combining with an additional quantity of water; and the metaphosphate of water appears then to become at once common phosphate without passing through the intermediate state of hydration of the pyrophosphate. Otto says, that on boiling the solution of metaphosphoric acid, it is very rapidly converted into the common acid, without, it seems, previously forming the deutohydrate.

The glacial phosphoric acid consists chiefly of HO, PO_5 , to obtain from it the ordinary acid, would appear to require merely to warm or boil its aqueous solution. On making the experiment, however, it will not be found so easy as supposed. The

committee having charge of the final revision of the Pharmacopœia, experienced this difficulty and handed the subject over to me for investigation.

It is well known that the monobasic acid produces gelatinous precipitates in the solutions of most metallic oxides, coagulates albumen, and after neutralization, yields with nitrate of silver a white precipitate; the deutohydrate resembles the former only by precipitating silver salts white after it has been previously neutralized; the terhydrate under the same circumstance, yields a yellow precipitate. For the following experiments, Merck's glacial phosphoric acid was employed, and care taken to select pieces perfectly transparent and free from earths and other acids.

If some of this glacial phosphoric acid is thrown into cold water, it is slowly dissolved, and the solution shows the above reactions of the monohydrated acid; set aside at our summer temperature for two or three weeks, the solution ceases to coagulate albumen, and yields now a purely yellow colored precipitate with salts of silver. The acid has been converted into the terhydrated, and apparently without becoming first the deutohydrate; for, in proportion to the decrease of the coagulation the yellow color of the precipitate becomes more apparent. The change is not brought about suddenly, but gradually; and similar is the behaviour of the deutohydrate; dissolved in water, it is gradually converted into the terhydrate. It is very probable that the bulk of the solution and its density, that is, the concentration of the solution, may have a marked influence on the time requisite for forming the terhydrate, as I shall show in another place, but my experiments were not extended so far.

When a strong solution of metaphosphoric acid in water is heated to the boiling point, and the boiling continued with the precaution to condense the evaporating water or most of it in the retort, so that the solution may at no time assume a syrupy consistence, it will be found that the bulk of the precipitate produced in a solution of albumen will gradually lessen, and after an hour or two, according to the amount operated with, will cease entirely; but now and at all times during the ebullition, the liquid, neutralized with soda or ammonia, produces a white precipitate with nitrate of silver, free from any tinge of

yellow. The solution, it appears, contains pyrophosphoric acid, and is not perceptibly changed on continuing to boil for several hours more.

The syrupy liquid contained in bottles filled with glacial phosphoric acid, after having absorbed some moisture, consists at first of the mono- and deutohydrate, dissolved in water; heated to boiling, it changes very slowly into the bibasic acid. As the conversion proceeded much slower than in the former instance, experiments were made with a very dilute solution.

This diluted solution, containing about a drachm of the glacial acid in 8 or 10 fluid ounces of water, was heated to boiling and kept at this temperature; in about twenty minutes it had lost the property of coagulating albumen; but previous to this, the precipitate with silver was perceptibly yellow, though not quite as deep colored as from the common phosphate of soda.

This precipitate had not become of a deeper yellow after the liquid ceased to coagulate albumen, and if the boiling was continued for several hours, little change could be perceived. It was evident that the solution contained some terhydrate and deutohydrate mixed. Experiments were now made with the same solutions, the strong, syrupy, and dilute, at temperatures between 110 and 200° F. In all instances the result was similar to that just described, with the exception that generally a longer time was required to alter the monohydrate, the lower the temperature was to which the solution was exposed. Now, too, the strong solutions afforded no evidence of the presence of the terhydrate after the monohydrate had disappeared, while the weak solution, on the contrary, contained terhydrate, as was shown by the color of its silver precipitate.

If phosphorus is oxidized by nitric acid, the solution contains common phosphoric acid, which, after evaporation, may by heat be converted into the deuto- and monohydrate. If the monohydrate is now dissolved in diluted nitric acid and heated, it will lose its property of coagulating albumen, and will produce a yellow precipitate with silver salts, identical in color with that obtained from the common phosphate of soda. This change in the presence of nitric acid does not appear to be unaffected by the density of the solution; but, as before, a more dilute solution is more readily converted into the tribasic acid than a concen-

trated one, and apparently without the previous production of the bibasic acid.

At first, I supposed that the metaphosphoric acid contained some compound requiring oxidation, before the change could be effected, but a careful trial showed the absence of any nitrous acid vapors by the time the conversion was complete. It is likewise not the presence of another mineral acid which effects the change of the mono- into the terhydrate; for when boiled with hydrochloric acid, the solutions scarcely yield more of the terhydrate than is obtained by the aqueous solution alone, while pyrophosphoric acid remains mixed with it, and an addition of common phosphoric acid does not exert any influence on the solution provided it be perfectly free from nitric acid.

That the cause cannot be looked for in the higher temperature, necessarily produced by the addition of nitric acid, is evidenced by the facts that the more concentrated solutions of the glacial phosphoric acid yield no terhydrate by boiling, while the diluted solutions boiling at a lower temperature, yield some, and that after the addition of nitric acid, the liquid need be but heated to near its boiling point to effect the change completely though more slowly than by boiling. The density of the solution, as will be seen from the above statements, exerts a strong influence in this process; but nitric acid converts both concentrated and diluted solutions into the common phosphoric acid.

It will require more and very careful experiments to determine precisely the way in which nitric acid acts in this case. That nitric acid merely acts as a catalytic agent, seems probable, from the absence of nitrous acid vapors; but it might be possible that a compound between metaphosphoric and nitric acid is formed for a short time, and decomposed again into nitric acid and the common phosphoric acid; or the monohydrated acid might be oxidized to a still unknown oxide, PO_6 or PO_7 , which is instantly decomposed into common phosphoric acid and oxygen, the latter in its nascent state uniting with NO_4 or NO_3 to form nitric acid again. Certain it is, that a small quantity of nitric acid will, with proper precaution to prevent its evaporation, change a considerable amount of metaphosphoric acid; and it acts quite or nearly as quickly upon the pyrophosphoric acid.

Graham, though he does not state so, undoubtedly operated

with diluted solutions of metaphosphoric acid, by which his statement above quoted will be partly explained, and the entire conversion into the terhydrate is merely an oversight, as a partial change only takes place. It is self-evident, that if a portion is thus altered, there ought to be a possibility of altering the whole in a like manner; the difficulty appears to consist in placing the entire solution in the same favorable condition, which is the proper large amount of water, and probably a certain temperature, which, when at the boiling point, induces the change most rapidly. If the proper conditions are ascertained, we may perhaps succeed in converting the entire bulk of a solution into the terhydrated acid; but an important point must be to prevent the formation of the deutohydrate, which, it appears to me, offers under all circumstances more resistance to form the terhydrate, than the pure monohydrate. Both, however, when in solution, succumb to the influence of time and of nitric acid, assisted by heat.

Of the behaviour of the three hydrates in their free and combined state to reagents, we still know too little, though it is an important and at the same time an interesting subject for further researches.

Philadelphia, July, 1861.

EXTRACTUM ANTHEMIDIS FLUIDUM—SYRUPUS ANTHEMIDIS.

BY JOSEPH A. HEINTZELMAN.

Several recipes for Fluid Extract of Chamomile have been published, which are neither equal in strength nor alike in the manner of manipulation.

It is certainly of great advantage, both to the physician and the practical pharmacist, to have equal and uniform formulas even for those preparations which are not yet standard recipes in any of the Pharmacopœias, but frequently called for and valued by physicians and others.

As important as the quality and the selection of the drugs themselves are, it is of no less importance to have proper solvents employed to extract the virtues of plants, and to gain all their active properties without impairing any. Such is the case

with Fluid Extracts and Tinctures in a concentrated form. In arranging those drugs, of which the active properties are to be extracted, we have to examine into their constituents, their volatility, &c., and to select the proper menstrua best adapted as solvents. Nor is it necessary to dissolve the worthless constituents, not having any valuable properties, that we may run the risk to injure the more active ones; which is often the case by employing a too high heat; or exposure to a temperature—cold or warm—too long continued; or substituting heedlessly one solvent agent for another, &c.

The active properties of chamomile flowers depend chiefly on a volatile oil, and bitter extractive, little soluble in water and diluted alcohol, but slightly in alcohol, and very soluble in absolute alcohol. The annexed formula for a fluid extract, according to the measurement—fluid ounce for each troy ounce—has given me entire satisfaction in regard to a reliable strength and quality, and is as follows:

R Flor. Anthemidis ℥viii. Troy.
Alcohol. deodor. (sp. gr. 0.809) Oiii.
Fiat Extr. Anth. fl. ℥viii.

As the flowers make a considerable bulk, no pains should be spared to reduce them to as fine a powder as possible, by grinding and contusion.

Moisten the powder with one pint of deod. alcohol thoroughly, and pack it into a conical percolator of 4 inches diameter, and 16 inches or more in length; to increase the weight of the displacing fluid, I use a heavy iron weight. After six hours' standing, displace with 2 pints deod. alcohol, carefully preserving the first 4 fluid ounces. Evaporate in a porcelain dish the remaining fluid *spontaneously*, at a temperature of 60–70°F. to 4 ounces. As the alcohol evaporates, a greenish resinous matter separates, which increases rapidly towards the end of the evaporation. Put it all carefully into a mortar, and rub it with the first 4 fluid ounces, which dissolve it; then filter, any loss in measure to be made up with deod. alcohol. This fluid extract is of a dark yellowish color, very bitter, and has the odor and taste of the flowers in a remarkable degree.

Syrupus Anthemidis.

℞ Extr. Anthemidis fl. ℥ii.
 Magnes. Carb. ℥ii.
 Sacch. Alb. ℥vii.
 Aq. fervent. q. s. ft. Syr. Anth. Oss.

Rub the fluid Extract of Chamomile intimately with the Carb. Magnesia; add two fluid ounces of the water in small portions, constantly triturating the mixture, and pour it on a small filter; then pour on water carefully until the impregnated water which passes measures four and a half fluid ounces. Dissolve the sugar at a gentle heat and strain. A syrup, thus prepared, is of a straw color, transparent, and of an agreeable, slightly bitter taste.*

Philadelphia, June 24, 1861.

ON CIMICIFUGA RACEMOSA.

By GEORGE H. DAVIS.

(An Inaugural Essay.)

Sexual System—Pentandria Di-Pentagynia.

Natural Order—Ranunculaceæ.

This is a small, stately plant, having a perennial root, and a simple herbaceous stem, which rises to the height of from four to eight feet. The leaves are large and ternately decomposed, having oblong ovate leaflets, incised and toothed at their margins. The flowers are small, white, and in terminal racemes, with occasionally one or two shorter ones near the base of the plant. The calyx is white, four-leaved, and deciduous; the petals are minute and shorter than the stamens, which are numerous and have yellow anthers; the pistil consists of an oval germ and a

* We would suggest that alcohol followed by diluted alcohol would be more appropriate for the extraction of Chamomile for a fluid Extract. We also dissent from the author's plan of making syrup of Chamomile, if, as he says, it has only a slightly bitter taste. This arises from the fact that the strong alcoholic menstruum does not take up the bitter extractive in full quantity, as, if present, it would be dissolved by the water, and not be influenced by the Carbonate of Magnesia.—EDITOR AM. JOUR. PHARM.

sessile stigma. The fruit is an oval capsule containing a number of flat seeds.

The black-snake root is common to most parts of the United States, growing in open woods and on hill-sides, flowering from May to August, when its long, white, wand-like racemes are very conspicuous.

The root is the part used in medicine. This, as found in the shops, consists of an irregularly contorted or bent thick head or caudex, from one third of an inch, to an inch in thickness, and from one to three inches in length, furnished with many slender radicles, and rendered extremely rough or jagged in appearance by the remains of the stems of former years, which, to the extent of an inch or more remain attached to the root. The color is externally dark brown, almost black, internally whitish.

The ligneous fibres are arranged in a crucial form, giving the root a tough consistence, and rendering it somewhat difficult of pulverization. The odor, though slight, is peculiar; the taste is bitter and somewhat acrid. Boiling water and dilute alcohol extract its virtues.

Medical Properties.

The medical properties of black-snake root are those of a mild tonic, and capable of increasing the secretions from the skin, lungs and kidneys.

It has been long employed in domestic practice in the treatment of various nervous affections; in chronic rheumatism, in those diseases of the lungs having a resemblance to consumption, and occasionally as an emenagogue. It is most usually administered in decoction made of the usual strength; the dose of which would be a wineglassful, repeated every two or three hours. The powdered root is given in doses ranging from fifteen grains to one drachm.

A tincture made by exhausting two ounces of the powdered root with a pint of diluted alcohol, is sometimes given in doses of two or four drachms.

Chemical Examination.

Four ounces of the powdered root were exhausted with cold water. The infusion had a dark brown color, a slightly bitter

taste, and the peculiar odor of the root. When first prepared it was perfectly transparent, but became turbid on standing for half an hour.

A portion of this infusion when agitated with a solution of corrosive sublimate, let fall a copious precipitate; with another portion, a strong fresh infusion of galls produced a curdy precipitate, and another portion, when boiled and allowed to cool, deposited a flocculent precipitate; tests indicating the presence of albumen.

To another portion of the infusion, a solution of sulphate of copper, and a slight excess of liquor potassa were added. This mixture when boiled for a short time, let fall a beautiful precipitate of sub-oxide of copper; this test indicating the presence of uncrystallizable sugar.

Another portion of the infusion gave a greenish black color, with sesquichloride of iron; a white curdy precipitate with sulphuric acid; and slight precipitates with tartar-emetic and gelatin; tests indicating the presence of tannic acid.

Another portion of the infusion was digested with an excess of gelatin for 24 hours. It was then filtered, and gave no precipitate with sulphuric acid, and gave with sesquichloride of iron a greenish black color, which was entirely dissipated on the application of heat; tests indicating the presence of gallic acid.

To another portion an excess of a solution of gelatin was added, allowed to stand for 24 hours, and filtered to separate the tannic acid. It was then boiled and filtered to separate the albumen, and gave with a solution of subacetate of lead, a flocculent precipitate, indicating the presence of gum.

By the evaporation of the remainder of the infusion, about 25 per cent. of a dark brown extract was obtained. This, when submitted to the action of alcohol and ether, successively, left 75 per cent. of a dark brown, slightly bitter extractive matter.

A portion of the root which had been treated with cold water, was boiled for 15 minutes with about four times its weight of water. The filtered decoction gave, when cold, an indigo-blue color with tincture of iodine, indicating the presence of starch.

1750 grains of the finely powdered root were exhausted with alcohol of .835. The tincture thus obtained, was evaporated by

means of a water bath to a syrupy consistence, and thrown into water. The precipitated resin was collected on a filter, and when well washed and dried was found to weigh 116 grains. This, when triturated with ether until it was no longer taken up, left 57 grains of a light brown resin insoluble in ether. This was redissolved in alcohol; the solution agitated with animal charcoal, until it became colorless, filtered, and allowed to evaporate spontaneously. The resin, as thus obtained, was nearly white, soluble in alkaline solutions from which it was precipitated on the addition of acids.

The ethereal solution was agitated with animal charcoal, until it became colorless, filtered, and by spontaneous evaporation, yielded the resin having a slightly greenish tinge. It was found to be soluble in alkaline solutions, from which it was precipitated on the addition of acids; this indicating the presence of a resin soluble in ether.

The root which had been treated in the former experiment with alcohol, was now exhausted by percolation with ether. The ethereal solution was evaporated to a small bulk, and thrown into water, when a very small amount of a fatty matter separated and floated on the surface of the water. It was absorbed by bibulous paper, to which it communicated a greasy stain which was not dissipated by heating; this indicating the presence of a small amount of fatty matter.

During the evaporation of the ethereal solution, a small quantity of a brown waxy matter was deposited on the sides of the evaporating dish.

A quantity of the root was reduced to a coarse powder, and macerated with sufficient water to moisten it, for 24 hours, transferred to a retort and distilled. The liquid which passed over was agitated with ether; the ethereal solution drawn off and allowed to evaporate spontaneously. By its evaporation, a very small quantity of an oily liquid was obtained. It possessed in a marked degree, the peculiar odor of the root, and communicated to bibulous paper a greasy stain, which was entirely dissipated by the application of heat; this indicating the presence of volatile oil in small amount.

The presence of green and brown coloring matters was proved by the action of animal charcoal on the two resins.

3500 grains of the root when submitted respectively to the action of cold and boiling water, alcohol, ether, dilute acids, and alkaline solutions, left 540 grains of a dark brown lignin, which was converted by sulphuric acid into a pasty mass, which was soluble in water.

Inorganic Constituents.

Fourteen hundred and forty grains of the root, when incinerated, yielded 120 grains of a light colored ash. A portion was lixiviated with boiling water; the solution evaporated to dryness, the product thus obtained redissolved in boiling water and filtered. When a portion of the solution was added to a solution of tartaric acid, carbonic acid was given off, and a white precipitate of bitartrate of potassa was obtained. Another portion, when neutralized with nitric acid and evaporated, yielded a salt having the appearance of nitrate of potassa, of a siline cooling taste, and which deflagrated when thrown on burning coals. Another portion of the solution gave with a solution of chloride of barium, a white precipitate which was but partially soluble in nitric acid. With another portion of the solution, nitrate of silver produced a curdy precipitate which blackened on exposure to the light, and which was entirely soluble in aq. ammonia. The foregoing tests proving the presence of carbonate and sulphate potassa, and chloride of potassium.

The insoluble portion of the ash was treated with dilute nitric acid, with the evolution of carbonic acid, proving the presence of a carbonate insoluble in water.

A portion of this acid solution, when neutralized with carbonate of ammonia, gave with a solution of phosphate of soda a white precipitate of the double phosphate of magnesia and ammonia.

With the remainder of the solution, a solution of oxalic acid produced a white precipitate of oxalate of lime.

The portion of the ash which remained after heating it with the dilute acid, was subjected to the action of the strong acid.

This solution gave with a solution of ferrocyanide of potassium, a blue color, indicating the presence of a salt of iron.

The insoluble portion of the ash was well washed with water, and then with a boiling solution of potassa. With this solution,

dilute acids produced a white precipitate, which, when dry, was found to be insoluble in water and dilute acids, indicating the presence of silica.

From the foregoing experiments, the organic constituents of Cimicifuga, are:—1, albumen; 2, uncrystallizable sugar; 3, tannic acid; 4, gallic acid; 5, gum; 6, extractive; 7, starch; 8, resin soluble in alcohol, and insoluble in ether; 9, resin soluble in alcohol, and soluble in ether; 10, fatty matter; 11, waxy matter; 12, volatile oil; 13, green and brown coloring matters; 14, lignin.

The inorganic constituents are salts of potassa, magnesia, lime, iron and silica.

ON KEROSOLENE.

A recently discovered Anæsthetic.

BY EDWARD PARRISH.

Some of the most useful scientific and practical discoveries have originated in accidents, the first results of which have involved disappointment or inconvenience—to evolve from these the lessons by which they may be made to subserve useful ends, should be one of the chief aims of the experimentalist.

To the accidental anæsthetic effects produced upon a workman employed to clean a cistern in a Kerosene Oil Works in Boston, we owe the recent discovery of a new use for an abundant product of the destructive distillation of coal; this product, though heretofore procured in a crude condition at a certain stage of the process, in the works alluded to and perhaps in others, has not until recently been rectified and thrown into the market, because no demand existed for it, for any known use of which it was capable.

With the enterprise so characteristic of New England character—a trait which so happily gave to science and humanity one of the greatest blessings of modern times—ether as an anæsthetic—the Boston physicians have taken measures to investigate the utility of this article for similar purposes, pending which it naturally claims the attention of pharmacutists in its physical and chemical characters.

Two bottles of the liquid have been sent me, the first by a medical friend residing in Massachusetts, and the second, at my request, by the manufacturer, Joshua Merrill, superintendent of the Downer Kerosene Oil Co., from whom I learn that *Kerosolene*, as it is named, is a product of the destructive distillation of "Albert coal," at temperatures varying from 600° to 890° F. The very volatile portion, separated by careful fractional distillation from the more fixed products which are sold as kerosene, is purified so as to remove its unpleasant odor, and thoroughly rectified.

As thus produced, kerosolene is a tasteless, colorless, though highly refractive, inflammable liquid, burning with a bright smoky flame; it is very mobile and volatile, and the bead disappears immediately. A vial when grasped by the palm of the hand, gives off small bubbles of vapor, raising the stopper; its odor is very faint, reminding of chloroform at first, though less agreeable as it evaporates, leaving not the slightest odor when it dries. Its sp. gr. varied in the two specimens as first received, that of No. 1 being .6346 at 76° F., of No. 2, .6325 at 72° F., but by exposure for two weeks in a partly filled tincture bottle, occasionally opened, the specimen marked No. 1, reached a sp. gr. of .6420 at 72° F.

From the last named fact and its known origin and mode of preparation, it would be supposed that this liquid had not a uniform composition, but must be a mixture of different carbohydrogens of varying density and volatility; the truth of this was proved by the following experiments: Specimen No. 1 was heated in a water bath, and its boiling points carefully noted. At 84° F. it commenced to boil, the temperature rapidly rising to 90°, and afterwards slowly, without becoming stationary, to 150°, when boiling ceased, about one-sixth of the original liquid remaining which was evaporated at about 200° without boiling. Specimen No. 2 was subjected to similar experiments; it commenced to boil at 82° F., ceased at 94°, recommenced at 100° and ceased at 105°, when the remainder, about two-thirds, was evaporated without boiling, at a temperature not exceeding 180°.

The extremely low sp. gr. of this substance and the temperature at which it begins to boil forbid the idea of its containing

the ordinary coal tar products in considerable proportion. The light naphtha first obtained in the distillation of coal tar has a sp. gr., according to Mansfield, of .900 to .950, and when purified by agitation with sulphuric acid and potash, or by the process of Gregory, in which peroxide of manganese is used, and rectified, its density does not fall below that of benzine, the sp. gr. of which, in its liquid form, is variously stated at .85 and .8991, at different temperatures.

The largest proportion of Kerosolene is evidently composed of those very light carbohydrogens not present in coal tar, and not produced at the high temperatures employed in the production of illuminating gas.

In the books I have consulted I find no detailed account of these almost gaseous liquids, and I can imagine no subject presenting more difficulties to the chemist. Prof. Antisell, in his thoroughly practical work on Photogenic and Hydrocarbon Oils, remarks that "the specific gravity and chemical constitution of the light and heavy oils vary in relation to the temperature at which they are distilled; and perhaps no two distillations give exactly the same relative mixture of the various hydrocarbons of which they are composed." The composition of these is further varied by the nature of the crude materials, which may be highly bituminous like the "Albert coal," from which the specimens under consideration were obtained, or more completely formed coals like the more common varieties.

The proportion of matter volatile at redness in the "Albert coal" has been stated at 61.74 per cent., that of the "Breck-enridge coal," of Kentucky at 60.27 per cent., while Pittsburg coal yields but 32.95 per cent.

Chemists have obtained from coal tar by fractional distillation several substances of great utility. Of these, benzine or benzole $C_{12}H_6$, which, as before stated, is the chief constituent of the light naphtha, is also a constituent of kerosolene, as ascertained by testing it with nitric acid, which developed the odor of nitrobenzole. The chief constituents of the photogenic liquids as thrown into commerce under the name of Coal oils or kerosolene, are Toluine $C_{11}H_8$, which has asp. gr. of .870 and boiling point 237° F., (Gerhardt .230,) and Cumene $C_{18}H_{12}$, which is also lighter than water, and boils at 314° ; it is not im-

probable that traces of these may be present in the new liquid, though they vary from it so much both in sp. gr. and boiling point. Experiments to detect Aniline $C_{12}H_7N$, in the specimens under examination failed to indicate it as might be anticipated, its sp. gr. being stated at 1.020, and the process of rectification with sulphuric acid being adapted to separate any alkaloids if originally present.

Compared with the commercial article of benzine, now so extensively sold, kerosolene presents several marked points of difference; three specimens of benzine I have examined have respectively, at 60° F., the sp. gr. .7521, .7661, and .8708; these differ in sensible properties from each other almost as much as they do from kerosolene. The most agreeable in odor I imported from England at a much higher price than that paid for the American varieties, which I have generally found disagreeably "balsamic," sometimes resembling impure illuminating gas, and leading to the belief that the gas was escaping into the room; one specimen became almost intolerable by age, while the color became gradually yellow. Kerosolene, as before stated, is almost free from odor, it is so very mobile, light and colorless that it could not be mistaken for benzine, and still less for kerosene, its properties having relations to the latter substance not unlike those of ether to oil of turpentine.

Under the name of Eupion, chemists formerly described a product of the destructive distillation of wood, which was believed to be C_5H_6 , but it has since been shown by Voelckel that the portions rising below 212° F. consisted chiefly of acetate of methyl with acetone, a little benzine, xylite and mesite.

The sp. gr. of eupion was stated at .655, its boiling point at 118° F., rising as high as 336° in some samples. Though stated to be the lightest of known substances, it will be seen that this product was rather more dense than our new carbohydrogen product. Accounts differed in regard to its miscibility with water and alcohol, it was, however, described as freely miscible with ether and oils, and as being of a faint and agreeable odor and without taste, which properties correspond with those of the liquor under consideration. That kerosolene contains no more than a slight trace of any oxygenated body was shown by

immersing sodium in it, a fresh surface of the metal was only slightly tarnished by the contact.

The solvent properties of this new substance are of course of primary importance, they appear to me to present the true key to its usefulness. It dissolves fixed oils, apparently, in all proportions, common resin freely, though with flocculent residue, wax and cocoa-butter freely, mastich and caoutchouc slightly. It mixes freely with alcohol, oil of turpentine, ether and chloroform, but not with water. Iodine dissolves in it sparingly, yielding a remarkably rich, though changing, purple color.

For the common uses to which benzine is now applied kerosolene appears to be equally adapted; by the absence of disagreeable odor it is rendered generally preferable; it is, however, unsuited to the purposes of illumination, or to generating heat, being too volatile, though its vapor does not appear to be explosive. Its extreme volatility makes it important that it should be excluded from the kerosene or other photogenic oils, and renders it a residuary product, heretofore without value, of those works in which it has been produced in a crude condition.

How far this product could be furnished by the manufacturers, of uniform quality, or whether it could be produced at other kerosene works, and by those numerous establishments in which the so-called rock oils now pumped in such vast quantities in the western slopes of the Alleghanies, are rectified, is a practical question yet to be tested; its relations are evidently to this class of bitumens rather than to coal tar.

In view of its use in medicine, the fact of the great uncertainty of its composition, its being a mixture of different and undetermined proximate constituents, must interfere with its general adoption and recognition.

The physiological effects of kerosolene, will probably be reported on at length by Dr. H. J. Bigelow, of Boston, to whom we are indebted for the first published account of it, from which, as contained in the Boston Medical and Surgical Journal, under date of July 11th, 1861, the following extract is made:—

“A few whiffs were sufficient assurance of its efficacy as an anæsthetic, which, with its other qualities, as I ventured to remark, would place the kerosolene beyond any known anæsthetic, provided its use was not followed

by headache, vertigo, or other unpleasant symptoms, and provided it should prove as free from danger as ether.

Subsequently, I inhaled the new vapor, which Dr. Hodges, at my request, administered. Complete insensibility supervened, lasting several minutes, with some diminution of the volume of the pulse. Its effect was wholly agreeable, leaving neither headache nor nausea, nor bad taste.

I have this morning administered it to three surgical patients. The first, a girl of 19, presenting some hysteric tendencies, having thrust some twenty needles in her leg, was wholly insensible during the extraction of four of those which remained. Yet there was more cough than I had expected from the wholly unirritating odor of the vapor, more muscular rigor than usual in favorable anæsthesia, and more intermittence of the pulse.

In a second patient, to whom it was given preparatory to an operation upon the face, insensibility was equally complete. But this woman did not take it kindly, and its complete effect was attended by so feeble and intermittent a pulse as to lead me to desist until she had recovered. A second attempt reproduced, with anæsthesia, the feeble and intermittent pulse, and I again desisted. Upon her recovery, I gave her common ether vapor, which she afterwards said was less agreeable, but which was followed by complete insensibility, the pulse beating steadily and full, at 76. Though this patient perhaps succumbed more readily to a third anæsthesia, there seemed to be in the two first trials a certain degree of purple color and asphyxia, with its attendant spasm, which I have elsewhere described as an occasional and disagreeable symptom of attempted anæsthesia. To guard against this asphyxia, which might possibly have resulted from the folded towel, upon which I habitually administer ether, I tried in the next case an open sponge. The subject required a considerable incision for a mammary abscess, and was a patient of Dr. H. G. Clark, with whose assent I tried the kerosolene. In spite of the open sponge, the symptoms of asphyxia again appeared, suggesting to Dr. Clark, before operating their resemblance to those resulting from charcoal gas. The color was livid, and the rigidity marked. In each of these cases, the quantity used was from one to two ounces."

This testimony suggests so much caution in the inhalation of kerosolene vapor, that I have not found the physicians to whom I have presented samples, eager to make trial of it. My friend, Dr. Thomas George Morton, gave it in four or five instances to full grown cats; in no case did it appear completely to destroy sensibility, though it seemed to deaden pain, and generally if the sponge was applied about 15 minutes to the animal, convulsions and violent twitchings resulted. To this I may add the testimony of my colleague, J. M. Maisch, who made the experiments I have mentioned on its boiling points, and un-

avoidably inhaled a portion of its vapor; his symptoms were described as first a pressure on his eyes, then pain in the temples, gradually ascending to the top of the head, where he continued to experience its unpleasant effects till relieved by a night's rest. In a second instance he had similar symptoms, though not so severe or persistent, leaving him in less than three hours.

In this connection I may advert to a curious discrepancy between Gmelin's Hand-book of Chemistry, as originally published in German, and Watt's English translation, published by the Cavendish Society. In the original, an observation of Snow is recorded that benzine vapor is narcotic (*narkatisviend*), while in the translation, vol. xi. p. 137, the observation is stated thus, "Its vapor does *not* produce narcotic effects when inhaled."

GLEANINGS FROM THE GERMAN JOURNALS.

BY JNO. M. MAISCH.

Urate of Soda was obtained by Dr. Baumgarten, of St. Louis, in microscopical transparent globules, resembling oil globules, by boiling soda with excess of uric acid, cooling, filtering and mixing the filtrate with a cold saturated solution of phosphate, bicarbonate, acetate, nitrate or sulphate of soda, or of chloride of sodium. After the removal of the salt by washing, the urate changes from its utricular condition into needles, both of the composition $\text{NaO}, \text{C}_{10}\text{H}_2\text{N}_4\text{O}_4 + 3\text{HO}$.—(Ann. d. Ch. und Pharm. xli. 106–109.)

Inosite.—Dr. L. Cooper Lane, of San Francisco, California, evaporates the infusion of the organs to a thickish liquid, mixes while boiling, with 3 or 4 volumes of alcohol, decants or filters, and sets aside to crystallize. If no crystals appear, the clear tincture is mixed with ether until a permanent turbidity remains. After 24 hours, all the inosite has crystallized in pearly scales. The alcoholic precipitate in the aqueous liquid on redissolving in water and treating with alcohol, will yield more inosite. If many other substances are present, it is advisable to precipitate first with acetate, then with subacetate of lead, decompose the latter precipitate by sulphuretted hydrogen or oxalic acid, and

treat the filtrate as above.—(Ann. d. Ch. und Pharm. xli. 118–120.)

Pus from an abscess on the right hip of a man was pale yellowish, thickish cream-like, faintly alkaline, and free from disagreeable odor; spec. grav.=1.022. C. Giesecke found it to contain 88.76 water and 11.24 solid substances, of which 10.12 were organic, 1.12 of inorganic natures, namely

4.38 albumen dissolved in the serum.

4.65 pus-corpuscles, mucus, together with little leucine and glutine.

1.09 cholestearine with some neutral fat.

0.59 chloride of sodium.

0.32 soda (combined with albumen) with little phosphate of soda and sulphate of potassa.

0.21 phosphates of magnesia, lime and protoxide of iron.

88.76 water.

100.00

(Ann. d. Ch. und Pharm. xli. 110.)

Specific gravity of Ammonia.—By operating with perfectly anhydrous ammonia, and after making the necessary corrections, Professor Jolly, of Munich, found the spec. grav. of liquid ammonia at 0° C., and compared with water of the same temperature=.6239, .6261, .6193, average=.6234, or one-sixth less than observed by Faraday. The specific gravity of the gas, compared with air of 0° C., and 715 m. m. pressure was found=.558, .576, .565.—(Buchn. N. Repert. x. 115–124.)

Use of Cyanide of Barium.—Margueritte and de Sourdeval prepare this salt from baryta under the influence of atmospheric nitrogen. Prof. Dr. R. Wagner now proposes it for the preparation of hydrocyanic acid by decomposing it with dilute sulphuric acid. With superheated steam it yields 18 per cent. ammonia and carbonate of baryta, from which cyanide of barium may again be readily made; by boiling with water, particularly under a high pressure, it is changed to formiate of baryta, yielding formic acid by the addition of sulphuric acid; superheated steam impregnated with carbolic acid, when passed over

the cyanide, yields anilin, and alcohol under a like condition, ethylamin.—(Buchn. N. Rep. x. 131, 132.)

To prevent mistaking Strychnia for Santonin, Dr. Henkel, of Tübingen, suggests to use in medicine only such santonin which has turned yellow in contact with the light; he believes it to have the same properties as the unchanged.—(Buch. N. Repert. x. 132.)

Pure Carbonate of Soda is prepared by F. F. Jordan, of Cronstadt, Russia, by granulating sal sodæ twice, allowing the mother liquor to drop off upon a funnel, washing the crystalline mass with a little cold water, and finally, slowly with alcohol, until this ceases to take up table salt; the residue may be recrystallized.—(Buchn. N. Rep. x. 133.)

Salep.—Prof. Buchner states that C. W. Barnickel, pharmacist in Remlingen, near Würzburg, prepares a very excellent salep from several species of Orchis, by digging the tubers, after the plants have been in flower, dipping them in boiling water, to remove the brown epidermis, and then drying the tubers carefully and rapidly upon hot sheet iron stoves.—(Buchn. N. Rep. x. 134.)

Test for Sulphurous Acid.—The acid is to be tested in neutral solution. Prof. Boedecker prepares the test liquid by mixing a considerable quantity of solution of sulphate of zinc with very little nitroprusside of sodium; this produces in a solution of a sulphite a rose or dark red coloration, increasing in intensity by a little ferrocyanide of potassium, by which a beautiful purple precipitate will appear, if the quantities are not too minute. Acids and alkalies prevent the reaction; bicarbonate of soda is without effect.—(Ann. d. Ch. und Pharm. xli. 193–195.)

Volumetric estimation of Phosphoric Acid and Arsenic.—Boedecker prepares the uranic nitrate, already proposed as a test by Leconte, by dissolving 20.2817 grm. of pure dry uranic oxide in nitric acid, and sufficient water to make one litre; each cub. c. m. requires 5 milligr. PO_5 for complete precipitation. Besides the alkalies, no base but lime, baryta, strontia, magnesia and oxide of zinc may be present. The solution is first mixed with

ammonia, and afterwards acidulated with acetic acid; the test liquid is now added and well stirred in, until a drop just produces a brown color, with a drop of ferrocyanide of potassium. The excess which is necessary to produce this brown color, is determined from acetate of ammonia acidulated with acetic acid, to which the uranic nitrate is added until the same color is produced with ferrocyanide of potassium; for 50 c. c. m. of liquid it will be about .8 c. c. m. This method is very convenient in the analysis of urine.

1 c. c. m. solution of uranium is equivalent to 5.281 m. grm. As. In the presence of arsenic and phosphoric acids, both may be estimated together, and after precipitating the arsenic by HS, the phosphoric acid alone. The difference will indicate the quantity of uranium necessary for the arsenic.—(Ann. d. Chem. and Ph. xli. 195–200.)

Arendt and Knop recommended uranic oxide for the same purpose in 1856 (Centralbl.) and Pisani lately in Comptes Rend. lli. 72, 106.

Estimation of Acids in Salts.—E. Langer and R. Wawnikiewicz, have been induced by Professor Bunsen, to experiment with acidimetric liquids for the estimation of acids combined with bases that are precipitated by potassa or carbonate of soda; the excess of alkali is corrected by normal hydrochloric acid. Experimenting with pure nitrates and sulphates, they have found that carbonate of soda will answer for salts of baryta, strontia, zinc, lead, bismuth, nickel, alumina; potassa was used for salts of copper, silver, ammonia and iron.—(Ann. d. Chem. und Ph. xli. 230–238.)

The titration of tin is effected by Stromeyer, by dissolving it in hydrochloric acid and immediately mixing it with sesquichloride of iron; $\text{SnCl} + \text{Fe}_2\text{Cl}_3 = \text{SnCl}_2 + 2\text{FeCl}$. The protochloride of iron is oxidized by permanganate of potassa, 1 equiv. oxygen represents 1 equiv. tin.

Tin dissolved more readily in a somewhat concentrated solution of ferric chloride, containing some free acid without evolving hydrogen. $\text{Sn} + 2\text{Fe}_2\text{Cl}_3 = \text{SnCl}_2 + 4\text{FeCl}$; in this case 2 oxygen represent 1 tin. The tin must be free from other metals.—(Ann. d. Ch. und Pharm. xli. 261–264.)

Fluorine in the ashes of Lycopodium complanatum was discovered by Prince Salm-Horstmar. The fresh plant yielded 6 per cent. ashes, 100 grms. of which contained .4 gm. Fl, or the part soluble in HCl .27, the insoluble portion (silica) .15 gm. Fl. In oats and straw he found baryta.—(Poggend. Ann. cxi. 329. Buchn. N. Rep. x. 38, 79.)

Estimation of free Carbonic Acid in water.—Prof. Dr. Pettenkofer mixes 100 c. c. m with 3 c. c. m. of a nearly concentrated solution of chloride of calcium, to decompose alkaline carbonates, and with 2 c. c. m. of a saturated solution of chloride of ammonium, to retain magnesia in solution, and finally with 45 c.c.m. lime water of known strength. In 12 hours the amorphous carbonate of lime becomes crystalline and insoluble; now 50 c.c.m. (one-third) of the clear liquid is neutralized with normal oxalic acid, and another third may be used for a controlling second experiment. The difference in the amount of acid required for neutralizing this mixture and the original lime water, indicates the free carbonic acid, that is, all uncombined acid, and all over and above that requisite for the formation of monocarbonates. Waters very rich in carbonic acid are previously diluted with a known proportion of boiled distilled water.—(Buchn. N. Rep. x. 1-9.)

Solubility of Sulphate of Ammonia.—Dr. A. Vogel found that 1 part of this salt, dissolved at ordinary temperature in 1.3 p. water.—(Buchn. N. Rep. x. 9-11.)

Conversion of Theobromina into Caffaina.—Prof. Strecker has succeeded in this conversion by heating in a sealed tube the compound of theobromina and oxide of silver, with iodide of methyle, and crystallizing the alkaloid from alcohol.

$$\underbrace{\text{C}_{14}\text{H}_8\text{N}_4\text{O}_4 + \text{AgO}}_{\text{Theobromina}} + \underbrace{\text{C}_2\text{H}_5\text{I}}_{\text{Caffeina}} \text{ yield } \underbrace{\text{C}_{16}\text{H}_{10}\text{N}_4\text{O}_4}_{\text{Caffeina}} + \text{HO} + \text{AgI}.$$

Theobromina.

Caffeina.

(Buchn. N. Rep. x. 32.)

A new iodine spring, near Partenkirchen, on the foot of the Bavarian Alps, has been discovered. Professor Buchner states that it contains the iodine as iodide of sodium, somewhat less than the celebrated Heilbrunn spring. It contains, beside this,

carbonate of soda, and a considerable amount of sulphuretted hydrogen.—(Buchn. N. Repert. x. 31.)

Antimony in Arsenious Acid.—Arsenious acid obtained by repeated sublimation at Andreasberg, was found by Dr. A. Streng to consist of 98.20 AsO_3 and 1.68 SbO_3 .—(Chem. Centralbl. v. No. 48. Buchn. N. Rep. x. 36.)

Dalleochine or Quinine Green.—10 grm. sulphate of quinia, 1000 grm. water, .128 litre solution of chlorinated lime, .032 lit. muriatic acid, and .192 lit. liquor ammoniæ are heated to 20°R . (77°F .) and after cooling, filtered. The dalleochine has the appearance of a green resin, is fusible, insoluble in water, benzine, oil of turpentine, bisulphide of carbon and ether, but soluble in alcohol, wood spirit and glycerin. Acetic acid imparts to it a blue color, nitric, muriatic and sulphuric acid dissolve it with a brown color, the green being restored on neutralization. Its solutions are precipitated by caustic alkalies, by corrosive sublimate, pale green; decolorized by protochloride of tin; nitrate of silver and alum have no reaction. The alcoholic solution, diluted with water, dyes silk, woolen and cotton, the latter with a mordant of albumen.—(Dingl. Polyt. Journ. clix. 66, 67. Ch. Centralbl. vi. 224.)

A double salt of carbonate of lime and chloride of calcium, $\text{CaCl} + 2\text{CaO}$, $\text{CO}_2 + 6\text{HO}$ was observed by J. Fritzsche in chloride of calcium prepared for technical purposes; it was in microscopic prisms, which are readily decomposed by heat and by water. It may be obtained by adding ammonia to a very concentrated solution of chloride of calcium and exposing it to the air.—(Bullet. de St. Petersb. iii. 285–292. Chem. Centralbl. vi. 225–227.)

Composition of Gutta Percha.—E. H. v. Baumhauer found gutta percha to consist of $\text{C}_{20}\text{H}_{16}$, and several products of oxidation, among which he proved to be $\text{C}_{20}\text{H}_{16}\text{O}$, $\text{C}_{20}\text{H}_{16}\text{O}_2$, and formic acid. Oxidation is the cause of gutta percha becoming brittle.—(Journ. f. pr. Ch. lxxviii. 298. Wittst. V. Schr. ix. 563–567.)

Lead cerate.—Eggenfels prevents this cerate from turning

yellow, by manipulating as follows: The wax and oil are fused in a water bath, the subacetate of lead, previously heated, is added in small portions, the mixture well stirred and digested for some time; finally the rose water previously heated, is added. A partial saponification and a subsequent emulsion takes place, the cerate retaining its original white color.—(N. Jahrb. f. Ph. xiv. 367. Wittst. V. Schr. x. 268.)

Arsenic in muriatic acid was found in 1840, by Wittstein, to be completely removed by mercury. Reinsch subsequently found copper to act in a similar manner. The grey crust with which copper becomes covered, he supposed to be pure arsenic. Lippert now proves it to consist of 32As and $68\text{Cu}=\text{Cu}_5\text{As}$; it evolves but little arsenic on being heated, and in a current of hydrogen, arsenic does not sink to less than 20 per cent.—(Wittst. V. Schr. x. 267, 268.)

Corn-plaster.—1 oz. powdered galbanum and 10 gr. turpentine are softened at a moderate heat, 8 gr. finely powdered sal-ammoniac are added, and the mass rolled out without employing oil or water; the plaster is to be kept in wax paper or bladder. After taking a foot bath, the plaster spread upon soft leather is applied, and renewed every other day after removing the horny skin.—(Müller's Ph. Zeit. 1861, No. 1. Wittst. V. Schr. x. 265, 266.)

Medical properties of Metamorphia.—Dr. Fronmüller employed Wittstein's metamorphia as a soporific in 7 cases, in doses of $\frac{1}{2}$ gr.; the result was in 5 cases complete, in 2 partial. The muriate was employed in 4 cases at $\frac{1}{2}$ gr. and in 1 case at 1 gr. The result was in three cases complete, in 1 partial, and in 1 unsatisfactory.—(Wittst. V. Sch. x. 262.)

Coloring matter in Acetic Acid.—Phosphate of alumina dissolved in potassa ought to yield a white precipitate with acetic acid. Wittstein observed it frequently to be pale red, but to turn white by ignition. The colorless acetic acid, therefore, still contains an empyreumatic coloring principle, probably one of the series of pyrrhol.—(Wittst. V. Schr. x. 259.)

Hemlock among Aniseed has been observed. In the Romagna,

hemlock grows among anise, and the harvesting of the latter is done with but very little care. Hemlock seed is larger than anise seed, and has prominent crenated ribs.—(Pharm. Zeit. 1860, No. 51. Wittst. V. Sch. x. 254.)

Citrate of Magnesia.—The granular powder, made in Paris, and sold in Greece under this name, is composed, according to X. Landerer, of 360 gr. bicarbonate of soda, 20 gr. citric acid, 300 gr. tartaric acid, 72 gr. sulphate of magnesia, .5 gr. oil of lemon. The tartaric acid and bicarbonate of soda are heated in a porcelain dish just to fusion, allowed to cool and then mixed with the other ingredients.—(Wittst. V. Sch. x. 218.)

Lotour or latour bark, which resembles false angustura bark, is employed by oriental dyers for heightening the color of cochineal; it is bitter, and is rendered blackish-green by salts of iron. The surgeons of the French African army, when stationed in the Piræus, employed the bark of *Strychnos nux vomica*, under the name of *Cortex simarubæ*; this resembles latour bark very closely, and Landerer supposes the latter to be likewise the bark of *Strychnos nux vomica*.—(Wittst. V. Sch. x. 219.)

Mummies are employed, according to Landerer, by the Oriental empirics, in rheumatic and arthritic complaints, in the form of ointment, composed of oil and powdered mummy. The powder taken internally with wine, is regarded as diaphoretic.—(Wittst. V. Sch. x. 218.)

Morphia and Marsh Mallow Syrup.—E. Janota observed that acetate of morphia is soon decomposed by marsh mallow syrup, and entirely destroyed; simple syrup is preferable.—(Oest. Zeit. f. Ph. 1860, 16.)

Fermentation of Sugar of Milk.—From a series of experiments made by Dr. R. Luboldt, under the supervision of Prof. E. Mitscherlich, the author derives the following conclusions:

1. Sugar of milk ferments very slowly; it is not previously transformed into fruit sugar.

2. Between 15 and 35° C. (59 and 95° F.) alcohol is always formed besides lactic acid; neutralization of the acid merely decreases, but does not arrest the formation of alcohol.

3. There is no regular proportion between the lactic acid and alcohol; the more diluted the solution of milk sugar, the more rapidly fermentation sets in, and the more alcohol is formed.

4. The estimation of alcohol is scarcely possible, inasmuch as all conditions are present for its oxidation to acetic acid.

5. The little cheese contained in the whey of milk, supplies the ferment, which soon finishes the process of vegetation, and then ceases to exert any influence, which is proven by concentrated solutions.—(Wittst. V. Schr. x. 207–214.)

Reaction of Quinia.—Dr. Leube confirms the reaction first observed by Brandes and Vogel; a beautiful red color is produced on shaking $\frac{1}{4}$ gr. sulphate of quinia with 2 drachms chlorine water, and adding 5 or 6 drops of ferrocyanide of potassium and 4 or 5 drops of ammonia; the color disappears by muriatic acid, but is reproduced by ammonia. Leube employs the same test for proving the presence of quinia in cinchona barks. He digests 1 drachm powdered cinchona, with 15 drops dilute sulphuric acid, and 2 oz. boiling water for 15 minutes, cools by setting the vessel in cold water, and adds to 1 drachm of the filtrate, 1 drachm chlorine water, 1 drop concentrated solution of ferrocyanide of potassium, and 1 drop ammonia; after shaking, a scarlet red color or precipitate is formed. Diluted solutions of quinia require for 1 drachm but 8 drops chlorine water and 1 drop each of the ferrocyanide and ammonia. 1 gr. sulphate of quinia in 16 oz. water may thus be detected, and likewise quinia adhering to cinchonia salts.—(N. Jahrb. f. Ph. xiv. 161.)

Dr. Flickiger (Schweiz. Zeitschr. f. Ph. vi. 65), confirms these observations, and adds, that chlorine water and ferrocyanide of potassium may be substituted by 1 drop of ferridcyanide of potassium; 1 drop of ammonia will then produce the same reaction in infusions of bark, but not in solutions of quinia; in the latter case, however, the coloration will appear by using chlorine water, ferridcyanide instead of ferrocyanide of potassium, and ammonia.

Examination of Cochineal.—The W. Gewerbezeitung, No. 8, recommends the following method for estimating the value of cochineal: ᠑i. cochineal is treated with ᠓i. hot water and ᠓ss. solution of potassa; ᠓i. water is added to the solution, and grad-

ually so much of a solution of 5 grs. pure ferrocyanide of potassium, until the purple color has changed into yellowish-brown, which is best observed in a drop being placed upon a white surface. The quantity of ferrocyanide used indicates the relative value.—(Schw. Zeit. f. Ph. vi. 15.)

Hydrargyro-iodide of Arsenic, prepared by rubbing together 790 gr. iodine, 470 arsenic, and 101 mercury with a little alcohol, must be protected from the light and air, otherwise biniodide of mercury separates in crystals, arsenic oxidizes and iodine is sublimed. Landerer recommends to prepare it *ex tempore* from the iodides of arsenic and mercury.—(Schw. Zeits. f. Ph. vi. 33.)

Recognition of Phosphates in urinary deposits.—Landerer recommends for this purpose to boil the sediments in diluted nitric acid, and add molybdate of ammonia, when the characteristic yellow precipitate of phospho-molybdate of ammonia appears.—(Schw. Zeits. f. Ph. vi. 34.)

Separation of Acetic Ether.—W. Engelhardt mixes the distillate obtained from acetate of soda, alcohol and sulphuric acid, with an equal weight of water, and dissolves in this liquid chloride of sodium to saturation, after previously neutralizing the free acid by magnesia. The acetic ether separated after 12 hours, has a spec. grav. of .89, and requires 7 parts of water for solution.—(Polyt. Notizbl. 1860, No. 23. Schw. Zeits. f. Ph. vi. 45.)

GLEANINGS FROM THE FRENCH JOURNALS.

BY THE EDITOR.

On the influence of the color of glass bottles on their contents, by M. Dumey.—In view of the custom now in vogue of employing blue glass for the purpose of counteracting the effects of light on chemical and organic substances, M. Dumey calls attention to the fact, that such glass has no action on the chemical rays, and that blue glass is not better than white glass for that purpose. But excellent results are obtained when red glass is employed, as the most easily effected substances undergo no

change from this agency when kept in red glass bottles. The author thinks that many bottles in the shop should be made of glass of this kind to prevent the destructive action of light on certain officinal preparations.—(*Répertoire de Pharm.*, June, 1861.)

On the action exercised on Phosphorus by the aromatic principle of Tar, by M. Deschamps.—If tar is put in a wide-mouthed bottle, and allowed to stand awhile with the mouth closed, so that the air enclosed shall become penetrated with the odorous portion of the tar, the air ceases to exert any action on phosphorus when a small mass of that substance is suspended in the bottle, neither vapors or luminosity in the dark are observable. To explain this phenomenon either the air must be deprived of its oxygen, a supposition wholly untenable, or, the tar must act simply by its presence. This last appears to be the true state of the case, as the oxygen is simply rendered inactive or paralyzed by the aromatic particles of the tar. The author details several experiments which prove this power of tar, but shows that it is also possessed by the volatile oils of mint, lemon, turpentine, benzine, ether, &c. Whilst the oils of cloves, anis, and mirbane, and chloroform, idoform, musk, tolu and benzoin have no action.—(*Répert. de Pharm.*, Mai, 1861.)

Chloroform for masking the taste of substances, by M. Grave.—The author has observed what he considers a new property of chloroform—that of modifying the taste of substances, as for instance, removing the bitterness of bitter substances. Mixed in certain proportions with tincture of aloes and gentian, and with sulphate of quinine suspended in water, chloroform deprives them almost entirely of bitterness. He leaves for others to ascertain to what extent it modifies the properties of these substances.—(*Rép. de Pharm.* Mai, 1861.)

Abortion in Cows occasioned by the ingestion of Ustilago madis.—This *Ustilago* is a parasitic mushroom, which occurs on maize as ergot does on rye. In a cow-house, where cows were fed on Indian corn infested with this parasite, eleven of their number aborted in eight days. After their food was changed, none of the others aborted. The better to be convinced of the

poisonous nature of these mushrooms, the author, after having dried and pulverized them, administered six drachms to two bitch-dogs with young, which soon caused them to abort.—(Annal. Méd. vetr. Belgé, and Rép. de Ph.)

Distilled Water of Copaiba.—Dr. Edward Langlebert calls attention to this new distilled water, which he has employed about a year in urethral blennorrhagia.

Every physician knows that copaiba taken in the stomach acts locally after passing the kidneys, by aid of the urine, and this action has been attributed to a certain modification which it undergoes by the *vital chemistry* of the economy. The author views it as a case of distillation in which the urine becomes the aqueous solvent of the oil of copaiba.

It is this idea which suggested to him the employment of the Distilled Water of Copaiba as a vehicle for urethral injections. The following are some of the injections which he has most frequently prescribed :

Distilled water of copaiba, three fluid ounces.

Sulphate of zinc, six grains.

Tincture of catechu, fifteen minims.

Mix.

Distilled water of copaiba, three fluid ounces.

Sulphate of zinc, four and a half grains.

Lapis divinus, one and a half grains.

Mix.

Distilled water of copaiba, three fluid ounces.

Sulphate of zinc, six grains.

Levigated oxide of zinc, a drachm.

Mix.

Distilled water of copaiba, three fluid ounces.

Tannic acid or catechu, fifteen grains.

Mix.

Numerous experiments have convinced the author that these

injections are superior to similar preparations in which distilled water or rose water are used in lieu of the copaiba water.

Copaiba water is prepared by simply distilling water along with copaiba, and separating the supernatant volatile oil. A metallic still is to be preferred owing to the bumping that occurs in a glass retort.

Administered internally, its effects are like those of copaiba, but milder. It has been prescribed in quantities of four to six ounces per diem, with a few drops of cherry laurel water to cover its taste. It is taken with less repugnance and has never caused pain in the kidneys, frequently produced by ordinary copaiba.—(*Gazette des Hospitaux, and Rép. de Pharm.*)

On the relative value of Extracts from different parts of plants.
—M. Hirtz, in studying the causes of variation in the therapeutic power of medicines, has made a series of comparative experiments on the medicinal power of the extracts of several narcotics, etc. To procure the extracts, he, in each instance, extracted the drug, reduced to powder by displacement with alcohol of 65 per cent. Evaporated the liquors to a soft extract, and treated this with alcohol of 80 per cent. The liquid thus obtained was then evaporated at 140° F. till a second extract was obtained. The following are the results, viz :

Extract of Aconite root is to that of the leaves as	25 to 1
“ Root of Belladonna to that of the leaves as	5 to 1
“ Seeds of Conium to that of the leaves as	10 to 1
“ Seeds of Digitalis to that of the leaves as	10 to 1
“ Seeds of Henbane to that of the leaves as	10 to 1
“ Seeds of Stramonium to that of the leaves as	5 to 1

M. Hepp, Pharmacien of Strasburg, in some experiments on the Seeds of Conium and Digitalis, obtained results, which in his opinion, did not corroborate the views of Mr. Hirtz, rather showing less comparative power in the seed than is stated by the latter.—(*Gaz. Med. de Strasb. and Rep. de Pharm.*)

GLEANINGS—MISCELLANEOUS.

Prizes distributed by the French Academy, 1861, M. J. Nickles, (correspondent of Silliman's Journal,) says that prizes for discoveries in Chemistry, Zoology, Physiology and Surgery, have been issued this year. The astronomical prize was divided between the five observers who discovered planets in 1860, viz. : Luther, of Bilk, Goldsmith of Paris, Chacornac, of Paris, Ferguson, of Washington, D. C., and Foster and Lesser, of Berlin.

The Cuvierian triennial prize was awarded this year to Dr. Leon Dufour, of St. Sever, at the base of the Pyrenees, for his researches in entomological anatomy. He is over 80 years of age, and has prosecuted his labors for nearly half a century.

The Chemical Prize.—The first chemical prize of 3,500 francs, was awarded to Mr. Berthelot, "for his researches in chemistry relating to the production, by synthesis, of certain chemical compounds existing in living bodies." The second prize of 2,000 francs was given to Dessaignes, "for the production of succinic, aspartic, aconitic, fumeric and racemic acids, by the transformation of sugar of gelatin."

Acclimation of the Ostrich.—For a long time the possibility of acclimating the ostrich has been doubted, under the impression that, like the elephant, this giant of birds refused to permit its posterity to be enslaved. This is an error, as already in Algeria, at Florence and in Spain, the young of this bird have been successfully raised. It is not yet known whether the birds born in captivity are capable of reproducing. The subject of attempting their acclimation is being considered by the Société d'Acclimation.—(Silliman's, July, 1861.)

Tough Lunar Caustic Points.—The editor of the "Chemist and Druggist," describes under this name what purports to be lunar caustic with about two per cent. of some adhesive material which renders it so tough as to be readily pointed, like a slate pencil. The name of the added substance is not mentioned, but it is said not to interfere with the action of the caustic. Each point about an inch long is neatly conical, and is enclosed in a glass tube. Dr. E. R. Squibb, manufactures conical pieces of lunar caustic, made tough by chloride of iron.

The Works of Lavoisier.—M. Dumas has undertaken to edit the works of Lavoisier, under the auspices of the government. Among the papers of Lavoisier obtained from M. Arago, Dumas has recently discovered an unpublished memoir, which proves that the author had many ideas in organic chemistry which have subsequently been discovered and worked out by Liebig and others. M. Dumas remarks, "If it be asked what were the ideas and opinions of Lavoisier, in regard to questions in organic chemistry, we must reply:—

1st. "He had discovered the process which seems to make all organic analyses, viz.: Their combustion by oxygen.

2d. "That he had learned also, as his laboratory records show, that instead of burning them in oxygen gas, he was able to burn them by means of metallic oxides, and instead of measuring the resulting carbonic acid gas, he had the means of weighing it after having absorbed it in two successive flasks of liquid potassa.

3d. "That he believed the bodies belonging to organic chemistry ought to be considered as the oxides or acids of compound radicals.

4th. "Lastly, that he understood the principal characteristics which distinguish the life of animals from that of plants; the character which pertains to each of the two organic kingdoms in the equilibrium of the forces of life; the part also which mineral matter serves in organic nature, combustion, and generally all which relates to its reduction."—(Silliman's Journal, July, 1861.)

Ricinate of Magnesia.—Under the head of *Notes and Queries*, in the Druggists' Circular for August, we find the following notice of this salt of which, however, the writer knows nothing in regard to its therapeutical value.

"It is prepared by saponifying 35 parts of castor oil with the caustic lye prepared from 25 parts of sal-sodæ, diluting the soap with water so as to form an even emulsion, and then precipitating the magnesian soap by the addition of a solution of 24 parts of epsom salts, and six of common salt. The ricinate is washed with water, dried in the water bath, and kept powdered." We should suppose that this salt would be decidedly cathartic, but have no knowledge of its having been used.

ON BETACINCHONIA, A NEW ALKALOID FROM CHINOIDINE.

BY WILLMAR SCHWABE.

In the laboratory of Mr. Eder, Pharmaceutist of Dresden, the author had occasion to purify commercial chinoidine, and then observed a new alkaloid, of which a number of salts were prepared and carefully examined. The elementary analyses were performed under the supervision of Professor Stein, and the crystals analyzed by Professor Lösche. The behaviour to solvents and the crystalline forms of the alkaloid and its salts, as prepared in different ways, exclude the idea of its being a mixture of two or more cinchona-alkaloids already known.

The chinoidine did not yield a clear solution with alcohol and diluted acids. The solution in dilute sulphuric acid was diluted with water and allowed to settle; the clear filtrate was precipitated with ammonia; the whitish, rapidly darkening precipitate was washed with cold and hot water, and carefully dried until brittle. This purified chinoidine showed a conchoidal fracture, became sticky in water, and dissolved clear in acids, but was not entirely soluble in alcohol. Its hot alcoholic solution was diluted with alcohol and allowed to rest. In a few days the clear solution was distilled, when the purified chinoidine, now perfectly soluble in alcohol and water, remained behind. It was, however, not a homogeneous uncrystallizable, but rather a gummy mass; and the surface of the sticks into which it had been rolled, contained a thin crystalline crust, which, after its removal and careful washing with alcohol to free it from chinoidine, was a white substance identical with the new alkaloid.

The difficultly-soluble sediment from the alcoholic solution as above is in "Geiger's Pharmacie, ii., by Liebig," stated to be impure cinchonia. It had, from adhering chinoidine, a black-brown color and resinous appearance. After solution in a diluted acid, the filtrate was precipitated with ammonia, and the precipitate, after washing with cold and hot water and drying, was triturated with alcohol of .845 and diluted with more alcohol. Next day the brown tincture was decanted and the residue washed with some alcohol, which was displaced with water. It now had a much lighter color, was again dissolved in dilute

sulphuric acid, the solution heated, and a hot solution of carbonate of soda added until a crystalline film formed, when, on cooling slowly, well-formed but slightly-colored crystals of the sulphate were separated, which, after repeated washing and crystallization, were pure. By dissolving them in acidulated water, precipitating with ammonia, washing, drying and redissolving the precipitate in boiling alcohol, the pure alkaloid crystallized on spontaneous evaporation. Or the impure sulphate may be dissolved in acidulated water, precipitated by ammonia, the precipitate washed with water and then with alcohol until the latter remains colorless, then dissolved in boiling alcohol, treated with charcoal, and allowed to crystallize. Quinia, if present, would have been removed by washing with alcohol, and cinchonia remained in the mother-liquor of the sulphate.

Properties.—Betacinchonia crystallizes on the spontaneous evaporation of a saturated alcoholic solution in quadrangular prisms three or four lines in length, the planes being joined at right angles; the ends are formed by planes at right angles with the prismatic axis, or by two planes, being at an angle of 119° with each other, of 120.5° with one pair and at right angle with the other pair of prismatic planes. The crystals of betacinchonia and some of its salts resemble in shape those of sulphate of brucia and lactate of zinc, the two end planes being in the former at 100° , in the latter at 147.5° .

Elementary analysis gave the following results:—

	Analysis.			Average.	Calculation.*	
C	77.146	77.672	77.043	77.285	77.922	$C_{40} = 240$
H	7.978	7.822	7.795	7.865	7.792	$H_{24} = 24$
N		9.102	9.075	9.088	9.091	$N_2 = 23$
O				5.760	5.195	$O_2 = 16$

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The alkaloid is obtained as a white, pearly crystalline mass,

* The author writes the formula $C_{20}H_{12}NO$, by which all the following salts must be viewed as basic. In conformity with the researches of Strecker and others on the various cinchona alkaloids, I thought best to double it, thus making all the author's basic salts neutral. This is in conformity with the view of the constitution of these alkaloids adopted in the United States.

if a concentrated alcoholic solution is diluted with water, and white, crummy and radiating crystalline on precipitating a salt by a base. Precipitated or crystallized, it is anhydrous, fuses at 150° C. (302° F.) to a colorless oily liquid, assuming a crystalline structure on cooling, decomposes at a higher temperature, and burns with a sooty flame. It is insoluble in cold water, scarcely soluble in hot water, soluble in 173 parts cold and 43 boiling alcohol, in 378 parts ether and 268 parts chloroform, and rather readily in volatile and fatty oils. Its alcoholic solution deviates polarized light to the right.

Potassa, soda, ammonia and their carbonates produce in the solution of its salts a white crummy precipitate, somewhat soluble in excess. Acidulated with tartaric acid, it is not precipitated by bicarbonate of soda.

The following exhibits the behaviour of its salts to reagents:—

Terchloride of gold, a sulphur-yellow precipitate.

Bichloride of mercury, a white precipitate, becoming resinous.

Bichloride of platinum in concentrated aqueous and in alcoholic solutions, an orange-yellow deposit.

Iodide of potassium in concentrated solution, white crystalline soluble in water.

Tincture of iodine and iodine water, crummy rust or red-brown, soluble in excess, in alcohol and ether.

Tincture of bromine, a yolk-yellow precipitate, consisting of microscopic globules.

Bromine water, no effect.

Picric and phospho-molybdic acid yellow pulverulent.

Tannic acid, yellowish white.

Permanganate of potassa is decolorized.

Concentrated sulphuric and nitric acids yield a clear solution, decomposed on heating.

Mixed with chlorine water, and afterwards with ammonia, the solution remains yellow.

Ferridecyanide of potassium produces in the solution of the sulphate a rose-red color, disappearing on the addition of sulphuric acid with the formation of a yellow precipitate, becoming crystalline.

Ferrocyanide of potassium, and afterwards chlorine water,

added to the sulphate, produce a red color turning green on the addition of ammonia.

Cyanide of potassium yields instantly a white precipitate.

Salts.—Betacinchonia forms with acids only neutral salts, which crystallize even from an acid solution.

Hydrochlorate of betacinchonia $C_{40}H_{24}N_2O_2$, $HCl + 4HO$ crystallizes in small four-sided prisms, dissolves in 22 parts cold and 3.2 parts hot water, in 1 part cold and one-fifth part hot alcohol, and in 550 parts ether. Its double salt with bichloride of mercury = $C_{40}H_{24}N_2O_2$, $HCl + HgCl_2$ is white and resinous. The double salt with bichloride of platinum = $C_{40}H_{24}N_2O_2$, $2HCl + 2PtCl_2$ crystallizes in anhydrous hexagonal prisms, pretty soluble in water, nearly insoluble in alcohol.

Hydriodate of betacinchonia $C_{40}H_{24}N_2O_2$, $HI + aq.$ small soluble crystals.

Hydrocyanate $C_{40}H_{24}N_2O_2$, HCy amorphous, insoluble in water and alkalies.

Hydrosulphocyanate: long thin crystals, efflorescing in dry air.

Sulphate $C_{40}H_{24}N_2O_2$, $SO_3 + 2HO$: four-sided prisms, soluble in 75 parts cold and 14 hot water, in 13.6 parts cold and $1\frac{1}{2}$ parts hot 80 per cent. alcohol, and insoluble in 98 per cent. alcohol and ether. The solution, much diluted, is very refractive.

Iodosulphate is analogous to herapathite.

Nitrate $C_{40}H_{24}N_2O_2$, $NO_5 + HO$ separates on spontaneous evaporation in oily drops, forming in four or six weeks colorless crystals, 1 to $1\frac{1}{2}$ inches in length; they are not efflorescent, and dissolve in water and alcohol.

Phosphate: well formed efflorescent crystals, readily soluble in alcohol, less in water.

Acetate: four-sided prisms, easily soluble in water and alcohol, and not efflorescent.

Tartrate: transparent crystals, becoming opaque, very soluble in water.

Oxalate is obtained like the nitrate, and crystallizes in very efflorescent radiating bundles.

The crystalline form, solubility and other properties of the new alkaloid and many of its salts are in the original compared

with the corresponding compounds of quinia, Von Heyningen's β quinia, cinchonia and Erdman's huanokia.—(*Arch. d. Pharm.* cliii. 273–291.)

J. M. M.

ON THE PREPARATION OF CHLOROFORM.

By MICHAEL PETTENKOFER.

Frequently preparing chloroform, the author noticed the great difference in the yield when operating with the same quantities of chloride of lime and alcohol, and apparently by the same process. Changing the process, using a chloride of lime of which the active chlorine had been estimated, and dividing the chloride of lime carefully in the liquid, did not produce an even result; it was observed, however, that the yield was less in proportion to the time which the mixture had been allowed to stand previous to distillation.

If a clear solution of chloride of lime is mixed with alcohol, the solution turns but slightly turbid in a temperature of 8–10° R. (50–55° F.,) and assumes but a faint odor of chloroform. The turbidness is stronger, and increases in a shorter time if exposed to a temperature of 88 to 100° F. Heated to 150–167° F., the mixture, unless too dilute, becomes gelatinous and evolves gas-bubbles of evaporating chloroform. If now the mass is heated to 167 or 185° F., until destitute of the odor of chloroform, the gelatinous appearance is gone, and the liquid contains a white precipitate of carbonate of lime. Besides the odor of chloroform, that of chlorine becomes apparent in proportion to the rapidity with which the mixture is heated to boiling, and the quantity of the precipitate is proportionately diminished. The temperature most favorable for the formation of chloroform lies between 46 and 60° R., (135 and 167° F.) Below 112° F. the yield of chloroform is always decreased, and the more so the longer the mixture had remained at a lower temperature. If the mass is quickly heated to the temperature of boiling water, hypochlorous acid appears to be evolved, thus causing a loss of a compound requisite for the formation of chloroform.

On distilling chloroform in larger quantities, particularly on heating rapidly and continuing the heat after the formation of chloroform is in progress, a peculiar odor of chlorine is frequently observed, interfering with the respiration, and the product has then a more or less greenish color; its temperature rises spontaneously to 30—45° R. (100 to 134° F.,) and generates gas of an acrid chlorine odor. If thrown into water, the chloroform becomes colorless, and the wash-water contains hydrochloric acid. In the direct sunlight, such chloroform loses its coloration instantly with more or less elevation of temperature. The more of this chlorine-compound is contained in the chloroform, the smaller is the yield.

If the mixture has been heated sufficiently, the chemical reaction increases the heat to the boiling point of water, all the chloroform distils over, and it is merely necessary to return the supernatant alcoholic liquid to the still, to obtain the chloroform contained in it, by a moderate heat. Two pounds chlorinated lime were intimately mixed with two gallons water of 90° C., when the temperature fell to 80° C.; after adding four fluid-ounces of 90 per cent. alcohol, the temperature was 75, but rose without any external heat in fifteen minutes to 87°, in twenty minutes to 91°, in twenty-five minutes to 95°, in thirty-five minutes to 97°, and in forty-two minutes to 98° C., without rising any higher. The mixture boiled with little foaming nearly half an hour, the chloroform vapors being condensed in the long neck of the flask. In seventy minutes the temperature fell to 94°, and in one hundred and twenty minutes to 60° C.

A number of experiments were made at different temperatures with alike quantities of chloride of lime, alcohol and water. The alcohol had a spec. grav. = .834; the chloride of lime contained from 27 to 28 per cent. active chlorine. The distillation was carried on in a tubulated copper still of eight cubic feet capacity, with a flat tin head and tin condensing pipe, kept in water of 50° F. The supernatant stratum of the distillate was repeatedly returned into the still as long as chloroform was separated by distillation. The chloroform was agitated with water, removed by a separating funnel and weighed.

The experiments may be divided into four distinct groups.

In every instance the quantity of chlorinated lime was 32 lbs. (Bavarian,) of water 60 maass, and of alcohol $2\frac{1}{4}$ maass.*

GROUP I.—The chlorinated lime was triturated with cold water, the alcohol was added, the joints of the still luted, and heat applied. At the commencement of the distillation the fire was removed, but moderately applied again, when distillation ceased.

Exp. 1.—The fire burned rapidly; distillation began in 30 minutes; the chloroform was of an intense greenish-yellow color, and became hot, spontaneously evolving much gas and losing its color. Yield, 20 ounces, or 3.3 per cent. of the weight of chlorinated lime.

Exp. 2.—Beginning of distillation in 45 minutes; chloroform greenish-yellow, lighter than No. 1; in the direct sunlight its temperature rose to 138° F., with the evolution of gas. Yield, 30 oz. = 5 per ct.

Exp. 3.—Distillation commenced in 58 minutes; its first distillate was deep green yellow, afterwards colorless; the mixture grew warm without evolving gas. Yield, 32 oz. = 5.3 per ct.

GROUP II.—The water was heated, the fire removed, the chlorinated lime carefully stirred in, and after ascertaining the temperature, which was between 167 and 153.5° F., the alcohol was added and mixed. The heat rose gradually; distillation commenced after some time, and the chloroform came over first in drops, afterwards in larger quantities, then slower again; after it ceased, the supernatant stratum of the distillate was returned into the still, and heat applied as long as chloroform distilled over.

Exp. 4.—Temperature of the mixture, 162.5° F.; commencement of distillation in 20 minutes; the chloroform was faintly greenish-yellow, and became colorless with little rise of temperature. Yield, $38\frac{1}{2}$ oz. = 6.4 per cent.

Exp. 5.—The water and chlorinated lime were heated together to 167° F., and allowed to cool to 156° before the alcohol was

* A Bavarian maass, = 43 cubic inches, contains, at 17° C., $35\frac{1}{2}$ oz. distilled water; 60 maass water = 2130 oz.; $2\frac{1}{4}$ m. alcohol of .834 = 65.34 oz. 1 oz. Bavarian medicinal weight = 30 grammes: 1 lb. med. w. = 360 grms.; 1 lb. Bav. civil weight = 560 grms. = 18 oz. 16 scrup. medic. weight.

added. Distillation commenced in 14 minutes, and was ended in 75. The chloroform contained little chlorine, and decolorized in the sunlight, the temperature rising slightly. Yield, 40 oz. = 6.7 per ct.

Exp. 6.—Temperature of the mixture 153.5° ; commencement of distillation in 20, end in 110 minutes; the chloroform contained very little chlorine, and became colorless without generating heat. Yield, 42 oz. = 7 per ct.

GROUP III.—Operation as in II. The temperature of the mixture of chlorinated lime and water was between 167 and 180.5° F.

Exp. 7.—Temperature 180.5° ; distillation commenced in 7 minutes; the chloroform contained chlorine, and became colorless, evolving heat. Yield, 32 oz. = 5.3 per ct.

Exp. 8.—Temperature 171.5° ; distillation began in 15 minutes; the chloroform contained chlorine, and decolorized in the sunlight, with evolution of heat. Yield, 34 oz. = 5.7 per cent.

Exp. 9.—Temperature 167° ; distillation began in 22 minutes; the chloroform contained little chlorine, and lost its color in the sunlight, with little rise of temperature. Yield, $35\frac{1}{2}$ oz. = 5.9 per ct.

GROUP IV.—Operation as before; temperature of the mixture between 135.5 and 117.5° F.

Exp. 10.—Temperature 135.5° ; commencement of distillation in 40 minutes; the chloroform was colorless and evolved no heat. Yield, 37 oz. = 6.2 per ct.

Exp. 11.—Temperature 122° ; distillation commenced in 3 hours, and continued in drops for 2 hours, when a moderate fire was applied. Yield, $30\frac{1}{2}$ oz. = 5.1 per ct.

Exp. 12.—Temperature 117.5° . A few drops commenced to come over after $3\frac{1}{2}$ hours; within an hour a small quantity of colorless chloroform came over in drops; the distillation ceasing, heat had to be applied. Yield, $28\frac{1}{2}$ oz. = 4.7 per ct.

These experiments show conclusively that with the materials of the same quality and quantity the temperature exerts an important influence upon the formation of chloroform. Between 135 and 167° F. the yield sinks scarcely below 6 per ct.; the largest amount was obtained by experiments 5 and 6, at 156

and 153° . Heated above 167° , the yield decreases as in Group III., and the chloroform contains more chlorine. At and below 122° , the yield likewise decreases, (Exps. 11 and 12,) but the chloroform is entirely free from chlorine or its acids, if a sufficient time has elapsed before artificial heat was applied.

The most variable quantity of chloroform is afforded if the ingredients are mixed at ordinary temperature, and the formation induced by heating afterwards. If the mixture is heated rapidly, and the temperature passes quickly above 167° , the amount of chloroform decreases; it contains much chlorine and evolves heat spontaneously; moreover, the mass is apt to pass over, and many troublesome precautionary measures are requisite to retain it in the still. If, on the other hand, the fire is removed after the temperature of between 135 and 167° is attained, the yield will be favorable. This circumstance explains the increased amount with a larger quantity of water in proportion to the chlorinated lime, as then the proper temperature may be accidentally more easily reached; but with the greatest care the yield is very variable.

By operating as directed for Group II. of the experiments, the chloroform distils spontaneously without danger for the mass to pass over, though the still may be far more than half filled. After the cessation of the distillation, the supernatant portion is returned and with a slight heat rectified; or it might perhaps be better to distil it by itself from a glass retort, or preserve it for the next operation.

Much of the result depends likewise on the shape and other conditions of the still. If made of a good conductor of heat, or being exposed to draughts of air, or supplied with a high head, the still will be refrigerated, and the contents require to be heated previously a few degrees higher, or the application of heat after the temperature has begun to fall. Larger quantities of material will of course less readily be cooled down.

The author used likewise three other vessels for preparing chloroform, from three to ten pounds of chlorinated lime. Employing a common demijohn set in straw, and cooling with a Liebig's condenser, he obtained from ten pounds of chlorinated lime 6 per cent. chloroform. A cask appears to be the most suitable still for chloroform, if connected with a good refrige-

rator; if some chloroform should be left behind, steam will carry it over. From a tin still, standing free in a high-pressure steam-apparatus, and a quantity of 3 lbs. chlorinated lime, no spontaneous distillation took place, until the head and upper part of the still were protected from rapid refrigeration by wrapping them in blankets.

Regarding the purification of chloroform, if a clean apparatus and alcohol free from fusel oil has been employed, it is but necessary to agitate it with a sufficient quantity of a solution of carbonate of soda, until the supernatant liquid has an alkaline reaction. The chloroform is separated, agitated with little water, and set aside in a cool place until both strata have become perfectly clear; the water is again removed by means of a separating funnel, and the chloroform filtered through a double filter, to free it entirely from water, while the funnel is kept covered with a glass plate. The rapidly-filtering chloroform is clear, possesses a pure odor, and is soluble in fat oils in all proportions.

If alcohol containing fusel oil—and the best commercial rectified spirit is not absolutely free from it—has been operated with, the chloroform, after having been shaken with carbonate of soda, is to be rectified by itself in the water-bath at as low a temperature as possible, to free it from the ethereal compound of a peculiar fruity odor, which, however, is not entirely removed by repeated rectification. If now coming over with water, the chloroform need but be filtered at a low temperature. Thus purified, it imparts to sulphuric acid but a very faint coloration after being agitated with it.

Chloroform is obtained of a very pure odor, if after freeing it from acid it is left in contact with freshly-calcined powdered animal charcoal, with repeated agitation, and after several days filtered or rectified in the water-bath.—*Büchner's N. Repert.* x. 103—115.

J. M. M.

ON SOME SPECIES OF HELLEBORUS.

By PROF. SCHROFF.

The ancients knew only *Helleborus niger* and *albus*,—the *Veratrum nigrum* and *album* of the Romans. Belonius first

recognized (1546) *Helleborus niger* and *Veratrum nigrum* as different plants, and Tournefort declares the former to be the plant of the ancients. It is the *Helleborus officinalis*, Sibth., s. *orientalis*, Lam.; probably also *H. antiquorum*, A. Braun., (*H. olympus* of others,) but not *H. niger*, Linn., which seems to be a rather hypothetical plant.

A different species is *Helleborus ponticus*, A. Braun., s. *orientalis*, Desf., growing in the neighborhood of Trapezunt. The plant resembles *Helleb. viridis* in appearance, but is of very little efficacy. Neither half a drachm of the fresh root, cut into small pieces, nor one drachm of the same dried and powdered, has any material effect on rabbits. One drachm of an ethereal extract produces emaciation with increased secretion of urine, sometimes terminating in death. The alcoholic extract kills rabbits under convulsions, if one drachm is taken; ten grains of it show still a marked effect.

Helleborus purpurascens, Waldst. Kit.—another species—is used by the Hungarians in the same manner as *Helleborus viridis* in Austria, especially in veterinary practice. The Romans call it *Spang*; it may be the *Cossiligo* of Columella. The fresh root is very much like that of *Helleb. viridis* in external appearance as well as internal organization. One drachm of it in powder, or twenty grains of the alcoholic extract, are sufficient to kill a rabbit.

Adopting the intensity of the effects produced as a basis of classification, we have to arrange the different species in this order: *Helleborus niger*, *ponticus*, *purpurascens*, *fœtidus*, *viridis*, *orientalis*.—*Zeitschr. d. Gesellsch. d. Aerzte zu Wien*.

THE ADULTERATIONS OF MUSK AND THE METHODS OF EXAMINING THE SAME.

BY PROF. W. BERNATZIK.

Musk in substance is examined by crushing, pulverizing, microscopical inspection and microchemical investigation. The more important agents used in chemical examination are: rectified oil of turpentine, glycerin, potash-lye, and nitric acid containing some nitrous acid.

A very small amount of musk, mixed with a few drops of oil of turpentine or glycerin, and heated for a short time, appears, when cold again, under the microscope, in the form of cloddy globules of a yellow (where accumulated, brownish) color, and is thus readily distinguished from powdered coal and other admixtures. Where the character of one or the other globule remains doubtful, a fresh portion of musk is heated with a few drops of a solution of potash. The dissolved light-brown substance presents under the microscope innumerable fat-globules of different size. Ammonia has a similar effect.

Nitric acid, mixed with musk and slightly heated, produces vapors, presenting the smell of musk and nitrous acid, and changes the musk to a light brown, soft, resinous mass, which turns into a brownish cloudy fluid under the addition of a little more acid. Appearance under the microscope same as before described. The addition of water produces a copious yellowish-red sediment, which is soluble in solution of potash.

Concentrated sulphuric, muriatic, acetic acids show no influence on musk in common temperature. Aided by heat, sulphuric acid produces a dirty brown frothy solution, which after a while turns turbid and blackish. The other acids named, induce even with heat, no great alteration, beyond vapors corresponding to the acid, swelling of the globules, and coloration of the acid, without perceivable solution. Similar is the action of iodide of potassium combined with iodine.

If admixtures are discovered, they should be isolated by treating the mass with diluent agents, especially cold or hot water, or by cautious flowing.

Musk that has been subjected to extraction (for perfumery purposes, etc.) is frequently used to adulterate the officinal article. This can be detected by dissolving the suspicious mass in different fluids. Hot water dissolves only fifty-five per cent. of well-dried musk. A solution of it in twenty parts of water is red-brown, somewhat thick, not easily filtered, of acid reaction, not disturbed by ether or alcohol. All mineral and organic acids produce a dirty brown sediment, leaving the solution of a yellowish-red color. A similar effect is shown by acetate of lead, the oxides of iron, muriate of tin, the nitrates of mercury and silver, sulphate of copper, chloride of platinum, sulphate of

alumina, common alum and muriate of baryta. Chloride of mercury does not disturb the fluid; potassa, soda, and the alkaline carbonates impart to it a darker color; ammonia and lime water cause a slight disturbance; tannic acid and many organic, especially animal, substances do that only when added in excess. Absolute alcohol dissolves musk not to the same extent as water, repeated extraction leaving 75 per cent. of a gray-colored, slightly brownish mass. The solution is of a yellowish-white and somewhat red color, with a fine white flaky sediment. Addition of water only affects it, when resinous or fatty substances are present. Diluted alcohol dissolves musk the more readily the more water it contains. Ether and chloroform possess hardly any dissolving power.

Adulterations with dried blood, animal coal, vegetable extracts, adipose substances, resins, asphaltum, stone coal, coffee sediments, etc., are recognized by the difference in the changes produced under the influence of other agents; desiccated blood, for instance, being not very soluble in water, etc.

It may be necessary to reduce the suspected substance to ashes. Burning musk smells like burned extract of urine. It leaves about five per cent. of grayish-white, here and there yellowish or pale red ashes, containing potash, lime, magnesia, iron, carbonic, phosphoric and sulphuric acids, chlorine, traces of ferrocyanate of potassa and sulphuret of ammonium. Blood leaves 8.5 per cent. of red brown ashes; other admixtures only a very small percentage.

Musk sold without pouches seems to be extensively mixed with inferior sorts—an adulteration which cannot be detected. Probably the mass remaining after extraction by alcohol is frequently used for the same purpose. Pouches that have been punctured and macerated in alcohol, are recognized by their shrivelled, knotty appearance. The residue left in the preparation of the officinal tinctures is possibly also sold for pure musk. Moistening is frequently resorted to, for the purposes of increasing the weight. Every specimen which loses much in weight by drying, should be rejected, for genuine musk, even if kept as dry as possible, has rather a tendency to increase somewhat in weight.

Pieces of lead or iron, small shot, stones, portions of tendons,

leather, paper and artificial musk are frequently added to, or substituted for a part of the contents of the pouches. Sutures and other occlusions appear after moistening the pouches by wrapping them in wet blotting paper.

Artificial pouches—Wampo-musk—never show the proper anatomical conditions: the genital opening, penis, etc. are wanting, and the heterogenous composing parts are readily discernible.—*Zeitschr. d. Gesellsch. d. Aerzte zu Wien.*

ON THE CONSTITUTION OF SCAMMONY RESIN.

BY H. SPIRGATIS.

After referring to the investigations of Johnston (Philos. Trans. 1839, ii. 342), his own (see Am. Journ. Ph. xxvi. 446,) and Keller's (Am. Journ. Ph. xxx. 256), the author describes the three samples of scammony, from which he obtained the resin for his researches; they yielded 71, 65 and 73 per cent. of pure resin, which was prepared by diluting the alcoholic tincture with water, treating with animal charcoal, and distilling off the alcohol; the residue is then treated for several weeks with hot water, which removes an odorous volatile acid and an inodorous compound of the same.

Thus prepared, the resin is amorphous, colorless and transparent, and yields a white powder. If containing water, it remains soft below 100° C.; dried at this temperature, it softens at about 123°, fuses near 150° C. (302° F.) to a clear colorless liquid, and decomposes at a higher heat. It dissolves in alcohol in all proportions, and is reprecipitated in flocks by water. It is likewise soluble in ether, benzole, chloroform, and more difficult in petroleum and oil of turpentine. The solutions in potassa, soda, ammonia and baryta yield no precipitate; impure resin yields with these bases a yellow solution, turning deep reddish yellow, and separating greenish grey floccules on heating. The resin dissolves also in boiling alkaline carbonates, and in acetic acid; the solution in sulphuric acid is of an amaranthine red, turning brown and black, splitting the compound which is likewise occasioned by hydrochloric and nitric acids.

The alcoholic tincture is not affected by little nitric acid,

acetate of copper, acetate and subacetate of lead, nitrate of silver and sesquichloride of iron (difference from guaiacum.) An adulteration with the resin of jalap (*Ipomœa jalapa*, Nutt.) is detected by the almost insolubility of the latter in ether. As an average from 8 analyses, the author obtained C56.50, H7.97, O35.53, agreeing well with Keller's results, but more so with Mayer's analyses of Jalapin, the resin from *Convolvulus orizabensis*, Pell. The formula $C_{68}H_{56}O_{32}$ requires 56.66, 7.77 and 35.57 per cent.

The resin was dissolved in caustic baryta, the latter precipitated by sulphuric acid, an excess of it removed by hydrated oxide of lead, and the lead thrown down by sulphuretted hydrogen. The colorless acid liquid possesses a peculiar odor, which is entirely removed by distilling it to a syrupy residue, after renewing the water several times. The distillate was turbid, of a strong acid reaction, and yielded, after being evaporated with carbonate of soda, on distilling with phosphoric acid, a small quantity of a volatile acid, resembling butyric and valerianic acid in odor. This impurity of the resin was not further examined. From the residue in the retort a crystalline mass is separated, apparently identical with one of the products of decomposition by acids. Merely traces of this crystalline principle and volatile acid are obtained from pure resin.

The syrupy residue is treated, when necessary, with animal charcoal, and evaporated to dryness, when an amorphous yellowish mass remains, resembling the original resin. It is very deliquescent, inodorous, of an acid, acidulous, afterwards bitterish taste, free from sugar, and soluble in alcohol, water, and less in ether. This *scammonic acid* gave from 4 analyses C54.59, H8.16, O37.25, corresponding with Mayer's jalapic acid, for which he calculated $C_{68}H_{56}O_{32} \cdot 3HO$. Fused with an excess of baryta, or dissolved in baryta water, and the excess removed by carbonic acid, the amorphous mass obtained has the composition $3BaO, C_{68}H_{56}O_{32}$.

If scammonic acid is heated with dilute sulphuric acid, or if the hot solution of the resin in baryta water is mixed with an excess of strong hydrochloric acid, oily drops were separated, which, after congealing, were purified by recrystallization from ether or diluted alcohol. The filtrate from this crystalline body

contains sugar (glucose). Ether left white granular crystals ; alcohol yielded microscopic thin needles. They are inodorous, of an acid reaction, acid taste, soluble in alcohol and ether, and gave from 5 analyses $C70.95, H11.51, O17.54 = C_{32}H_{30}O_6$. This *scammonolic acid* has the same composition and properties as Mayer's jalapinolic acid, which was obtained by this chemist only by decomposing jalapic acid with fusing alkalies ; by acids he obtained jalapinol, which on combining with alkalies, lost 1 equiv. HO, and became this acid.

Scammonolate of soda $NaO, C_{32}H_{29}O_5$ of potassa and ammonia crystallize in white needles and are soluble in water and alcohol. The results of 7 analyses of scammonolate of baryta and 2 of the lead salt agree with Mayer's jalapinolates. Scammonolate of oxide of ethyle is obtained by saturating the boiling alcoholic solution of the acid with hydrochloric acid gas, decomposing with carbonate of soda, and purifying from alcohol ; prepared in the same manner from the resin, the liquid contains sugar. The ether crystallizes in flat tables, fuses at $32.25^\circ C.$, and shows from 3 analyses the composition $C72.39, H11.65, O15.96 = C_4H_5O, C_{32}H_{29}O_5$.

Scammonolic acid treated with nitric acid of 1.30 spec. grav. yields crystals, which from their shape, solubility, behaviour to reagents, and from one elementary analysis, are most probably identical with Mayer's ipomic acid ; the mother liquor contains oxalic acid. Want of material prevented further researches.

The author would consider the resin of scammony identical with that of *Conv. orizabensis*, but for his obtaining scammonolic acid from resin of scammony, on treating it with acids, while Mayer's jalapin yielded by a similar treatment, first jalapinol, and jalapinolic acid only after employing fusing alkalies.

The author concludes with a long and searching criticism of Keller's two papers on the same subject.—(*Ann. der Chem. und Ph.* xl. 289–323.)

J. M. M.

ALCOHOL—ITS ACTION AND USES.

The question of the action of alcohol on the system, and its value as a dietetic and therapeutic agent, is now attracting much attention both amongst the members of our profession and the

scientific world at large. No doubt can be entertained of the importance of a consideration of the subject—a consideration, however, into which our limits will not allow us fully to enter. If there were one cherished view which we thought chemistry had taught us, it was surely that alcohol was oxidised in the system, and thus made subservient, if not to the formation of some of the tissues of the body, at any rate to the maintenance of animal heat. However indisposed physiologists may have been of late years to give in their adhesion to the theories of Liebig as to the division of alimentary materials, we think that most have been, and probably many will still be, disposed to consider the substance we are speaking of in the light of a heat-producing agent. Our opinions on this point have, however, been somewhat rudely assailed, and the position which alcohol has occupied as a dietetic article is threatened with imminent danger. As from the chemists we received the theory of its combustible nature, so from chemical research and experiment now comes the opposite doctrine of its entire elimination, unchanged, from the body.

Considering the vast amount of alcohol which is daily consumed, whether as a general article of diet, or in the treatment of disease, it becomes a matter of essential importance that correct principles should be laid down with reference to its *modus operandi*, and the manner in which it is disposed of in the system. We cordially hail, therefore, the appearance of the work of Messrs. Lallemand, Perrin, and Duroy (*Du Role de l'Alcool et des Anesthésiques dans l'Organisme*, Paris, 1860,) which gives us the results of the most recent experiments and researches on the subject. A careful perusal of this work has convinced us that some of our views of the dietetic value of alcohol require modification; but we cannot, on that account, allow the evidence which is brought forward, and which does not appear to us conclusive on the point, to make us discard altogether the substance of which we are speaking from our list of alimentary materials.

If we were briefly to sum up the facts which the researches of the above authors seem to have established, they would be these:—That, after any fluid containing alcohol is taken, the latter becomes eliminated, unchanged, by the various secreting organs.

—the skin—the liver—the kidneys—the lungs; and not only this, but that it is deposited in all the tissues, and can be extracted alike from the substance of the brain, the liver, the muscles, and the cellular tissue, as well as from the blood. It is right to observe that, even when small quantities of alcohol were taken, traces of it could be found in the excretions; thus proving that it is not simply when the substance is taken in excess that it becomes eliminated without change.

From the results of their experiments MM. Lallemand, Perrin, and Duroy think they are justified in concluding that all the alcohol ingested, with the exception of a small quantity which they and other experimenters have found converted into acetic acid in the stomach, is eliminated from the body, without undergoing any change whatever; and that in this respect it resembles in its action the various anæsthetic agents, such as chloroform, &c. From these conclusions necessarily follows the inference that alcohol cannot be considered in the light of an alimentary substance.

We believe Dr. Percy was the first to show that, after poisoning by alcohol, this substance could be found in the ventricles of the brain, as well as in the brain-matter itself; and we are all aware of the fact, that fumes of alcohol are exhaled from the lungs even when only a small quantity of the fluid has been swallowed. The chief points that are new, which have been brought to light by the investigations of our authors, are the elimination of the alcohol unchanged through the medium of the skin, the kidneys, &c.; and its deposit in the tissues generally. It is true that Klenke had demonstrated the presence of alcohol in the urine and bile; but with this exception, physiologists had advanced the opinion that the secreting organs did not eliminate the substance.

There cannot be a doubt of the great importance and value of the researches of M. Lallemand and his coadjutors; for supposing their results to be trustworthy—and we believe them to be so—they establish beyond a doubt the fact that, at any rate, a portion of all ingested alcohol may go the round of the circulation, traverse the various capillaries of the body, and without undergoing any oxidation whatever, be ejected from the system in the different secretions. This portion, therefore,

cannot be concerned in building up the fabric of the body, nor can it by its combustion contribute to the maintenance of animal heat. This is surely an important conclusion to have arrived at. The weak point, however, in the arguments adduced against the value of alcohol as a respiratory food, is the small quantity of it which the experimenters have been able to extract from the various secretions. It is possible that, by more delicate modes of investigation, and by the use of more subtile tests, a much larger proportion may be detected; but we are inclined to think that, until some such result is obtained, physiologists will not be disposed to abandon their views as to the oxidizable nature of the substance.—*Lon. Pharm. Journ. May, 1861, from Br. Med. Journ.*

ON THE COMMERCIAL PURIFICATION OF BITTER ALMOND OIL,

By JOHN S. BLOCKEY.

The poisonous nature of this substance in its crude state warrants the conclusion that some method of perfectly freeing it from prussic acid or combined cyanogen should be universally adopted, either in its first formation from the almonds, or in the subsequent rectification.

Whether even then it is quite harmless is, I think, yet to be proved, and the experiments detailed below tend to show that it possesses very powerful properties, although not so poisonous as the crude oil. Possibly, like many essential oils, it may be found available in medicine. Gerhardt states that the oxide of mercury will free the crude oil from cyanogen, but I have repeatedly tried the efficacy of this agent both alone and with water at various temperatures and during various durations without any success. I also assured myself that the HCy is not in a free state, for no effervescence takes place on the addition of NaO Co₂ either in solution or otherwise. I next tried caustic potassa, but the only effect was to produce a quantity of benzoate of potassa equivalent to the amount of alkali employed. The hydrated oxide of mercury appears to have no action. I concluded, therefore, that some plan must be adopted to free the cyanogen from the oil, which would possess sufficient affinity

for that purpose, and at the same time not exert any action on the free hydride of benzoyle. After many attempts, one of which consisted in trying chloride of iron and lime, I finally adopted the following plan. I had found that on mixing a small quantity of oxide of mercury and water, and agitating the oil, and then adding a little caustic potassa and filtering, that the oil passed through clear and colorless and entirely free from cyanogen; but I found that the purified oil dissolves appreciable quantities of the mercury, and if chemically pure hydride of benzoyle be digested on dry oxide of mercury and filtered, it will be found to dissolve it to a certain extent. I therefore procured a wrought iron still, having a very long neck, around which a stream of cold water was allowed to pass, so as to cool the vapor sufficiently in order not to crack the glass tubes of the condenser. I found that an ordinary metal worm was speedily dissolved by the distillation of mercury. The pure oil does not dissolve metallic mercury as it does its oxide. In the retort of the still I placed a quantity of crude oil, a small quantity of solution of caustic potassa, and lastly, the quantity of oxide necessary. The actual weight of the latter has to be varied. Some kinds of oil contain more cyanogen than others, and the requisite quantity of oxide was determined on a small quantity and filtration. The quantity of potassa required is, strange to say, very small in all cases, and I always found that, although distillation with HgO and water alone never succeeds in freeing the cyanogen, a small quantity of caustic added produces perfect separation. More alkali must not be added than necessary, or the high heat of the distillation will cause the formation of benzoate; and if the operation be effected by means of a current of steam, the water dissolves large quantities of the oil. For this reason as little water must be added as will suffice to dissolve the caustic alkali, and by careful management of the heat nearly all the water comes over before any oil distils.

Towards the close of the operation, large quantities of a thick smoke suddenly pour over, smelling strongly of some of the acryle compounds. I have been unable to determine at present to what these fumes are due, but I have noticed that as the oil distils it gets darker in color, and at last a tarry matter containing nitrogen comes over, and I have sometimes, by very cautious

management, been able to obtain all the pure oil some seconds before the sudden evolution of fumes. The oil then requires filtration from small globules of mercury, and one-tenth of rectified alcohol to be added,—the use of spirit is to prevent the gradual decomposition of the pure oil, as it becomes turbid and speedily deposits crystals, especially if not perfectly secured from the air. I have never yet had an opportunity of determining the composition of this substance, although I have kept a quantity for some years till an occasion should offer. It sublimes, leaving carbonaceous residue, melts at a low heat, and solidifies again to a crystalline mass.

I intended pursuing this investigation further, but other matters have since occupied me. I should have liked to determine the composition of the tarry residue in the retort, of the acrid vapors, and of these crystals; also to ascertain whether the oil dissolves other oxides, and to what extent. As I cannot foresee any opportunity for so doing for some little time, I am compelled to postpone a paper on these subjects. Meantime, I send the result of some experiments on the effects of the pure and impure oil on the living animal.

Fifteen fluid minims of crude oil administered to a full-grown cat, produced all the poisoning symptoms of prussic acid: violent, spasmodic contractions, &c.; the slightest touch producing a contraction in the limb touched; in twenty-four hours the cat was alive and apparently well.

Twice the above dose killed another cat almost instantly.

Thirty fluidminims of pure oil seemed to act powerfully at first as a stimulant, terminating, after a minute or two, in loss of all power of motion, gradually diminishing, and the animal eventually got well.

The above doses were all administered in olive oil. Thirty fluid minims of pure oil administered alone killed a cat in some hours.

Ninety minims of pure oil alone killed a cat instantly.

Further experiments suggested themselves, but the destruction of life is not a pleasing subject for experiment, and the above are sufficient to show the poisonous nature even of pure oil, and that this effect is greatly modified by the presence of olive oil.—

Chem. News London, June 2d, 1861.

NOTE ON BLOOD-STAINS.

BY M. GUIBOURT.

One of the problems of chemical jurisprudence most frequently presenting itself is that of determining the nature of supposed spots of blood, and one of the most usual methods consists in treating the spots in a manner accurately described in special works with a small quantity of distilled water. This water, in the case supposed, dissolves the coloring matter of the blood, leaving the fibrin on the spot. The liquid, which is red and transparent, loses its color by boiling, and forms a gray coagulum, which a small quantity of caustic potash will re-dissolve. The liquid, again become transparent, appears either reddish or green according to the manner of looking at it.

Let us suppose an operation carried on in a straight glass tube closed at one end. The alkaline liquid prepared as is about to be ascribed, will appear green by transmitted light; that is to say, when the tube is placed between the eye and the daylight. If, on the contrary, the experimenter stands between the tube and the light, the liquid appears reddish, the color being perceived from the same side as the reflected rays.

M. Picquot, junior, a pharmacist Bar-le Duc, when called upon to decide whether the spots found on some planks in the house of a suspected murderer were spots of blood, after having obtained the preceding results, was much puzzled by reading in M. Devergie's "*Médecine Légale*" that the sanguineo-alkaline liquid is green seen by reflection and rose colored by refraction (vol. iii. p. 822). M. Gaultier, of Claubry, is even more positive. In his "*Chimie Légale*," p. 7, he says:—"The liquid takes then a green tint seen by reflection and rose by refraction.

* * * * The green coloration by reflection, rose or reddish by refraction, is a certain proof of the presence of blood." M. Picquot finds here a confusion of words, and I quite agree with him. First, the green color seen by transmitted light on placing the tube between the eye and the light is evidently not a reflected color. Again, this same green color is refracted, since the luminous rays cannot traverse the liquid without undergoing refraction on entering the liquid and again on emerging from it.

Only the reddish color seen from the side whence the light proceeds simultaneously with the reflected rays can be said

to be seen by reflected light : but it must be remarked that it is not reflected directly by the exterior surface of the liquid. It proceeds from all the internal points, undergoes a multitude of internal reflections, and is finally refracted on its exit before reaching the eye.

For the sake of accuracy, it is necessary to substitute in place of the characteristic phrase of MM. Devergie and Gaultier, of Claubry, the following proposition:—The sanguineous liquid (obtained after re-dissolving in caustic potash the coagulum produced by heat), if observed in a straight tube, appears green when placed between the eye and the sun, and reddish if the observer is placed between the sun and the tube.

A straight tube is requisite, because if a flask or any other vessel of a certain diameter is used, the liquid appears rose colored under all circumstances. If a half-filled flask is shaken the lower portion appears rosy, but the supernatant froth appears green. In a full flask, seen by reflected light, the whole appears rose colored ; when seen by transmitted light the liquid contained in the spherical part of the flask always appears red ; whilst that in the straight neck appears green. It is astonishing to observe the same liquid in one part of the vessel appear green and in another part reddish. These variations in no degree invalidate the certainty of the conclusion that no other substance than blood unites the characteristic successively observed in the experiment, namely:—

1. The red color of the liquid.
2. Its decoloration and coagulation at boiling heat.
3. The grey color of the coagulum, and its complete solubility in a small quantity of caustic potash.
4. The rose color of the alkaline coagulum seen by reflected light in a straight glass tube, and its green color under transmitted light.
5. The distinct and simultaneous appearance of two colors in a small straight-necked flask when the quantity of liquor is large enough to admit of its observation.

All this is without prejudice to the microscopic observation of spots and search for blood globules, which constitute the essential characteristic and most certain indication of the presence of blood.—*Chem. News, London, June 2d, 1861, from Journ. de Pharm. et de Chim.*

SOME REMARKS UPON SHELLAC, WITH AN ESPECIAL REFERENCE TO ITS PRESENT COMMERCIAL POSITION.

MR. MACKAY.

But to go still further from home, and to come more especially to speak of the article it is my intention very shortly to introduce to your notice, I may at once refer to the extraordinary position which shellac holds at the present time in the commercial world. This substance is known to us all, for although not used in medicine, it is extensively employed in the arts. Thus, it is the principal ingredient in our finer kinds of sealing-wax, while in that very important manufacture, hat-making, it is not only largely employed, but no substitute can be found. For wood-polish it is a necessary ingredient, and our pianos and other pieces of beautifully polished furniture, would be less pleasing to the eye were we deprived of shellac. In varnishes used by the upholsterer and others, its presence cannot be dispensed with; while the dye, which forms an integral part of this gum resin, is so much used by the woollen manufacturer, that even the gay clothing of soldiers would be dull and dim without the aid of the permanent and beautiful lac dye.

Before speaking of its commercial relations, it may not be uninteresting to refer more particularly to the manner and places of production. Our supplies are obtained chiefly from the East Indies, the districts most noted being Assam, Pegu, Bengal, and Malabar, and along the course of the Ganges.

The shipments are, however, made principally from Calcutta. In the districts above named there are two or three very large establishments at which they employ more than a thousand hands. Besides these factories, there are numerous makers on the small scale. A feeling of secrecy pervades the establishments, and strangers are refused admittance. On the twigs of certain trees, known as the *Ficus religiosa*, *Ficus indica*, *Rhamnus jujuba*, *Croton lacciferum*, and the *Butea frondosa*, found in the jungle and forests of India, a small insect called the *Coccus ficus*, fixes and there deposits a certain quantity of a dark colored resinous matter. This, on careful examination, has been found to be the stomachs of those insects left there after death as food

for their larvæ, the outer or specially resin coating being intended for the shelter and protection of the young. It is about the months of November or December that the brood make their escape from their previously protected habitations, and fasten themselves in their turn upon the small branches. As these increase (which they do very rapidly) the twigs or stems become completely covered, and at a particular season of the year are collected, placed in sacks, and carried to the manufactory. These encrusted twigs are first ground in a mill to rough powder, and then carried away to what is called the dye work of the establishment. Here troughs are ready for their reception, and after being immersed in water, the natives commence and tread upon the material, so as to remove the dye from the resin, &c., and as this coloring matter is soluble, it is in a short time taken up by the water, run off into othersuitable vessels, fresh water added, and the process continued, with the addition of fresh quantities of water, until the whole is completely exhausted. The remains are then collected, the woody fibre, &c., got quit of, and the little particles which remain freed almost entirely from color, called and recognized in our market as Seed Lac. The different waters which have thus taken up in solution the coloring matter of the stick lac, is run into cisterns or vats, where the deposition in course of time takes place, and then the powder in the form of paste is partially dried, put into square cases, stamped, and thoroughly dried, forming the regular lac dye of commerce. It is sent home to this country in those square blocks and reduced to powder for the purpose of trade. I may as well dismiss this part of my subject by stating, that this dye is used very largely and very extensively in dyeing woollen goods. Struck with a perchloride of tin, it becomes a fine and very beautiful scarlet. This preparation is well known, being made by boiling tin in hydrochloric and nitric acids, and from its general use for the above purpose has commercially received the name of *Lac Spirits*.

The great commercial importance of this article may be better understood when I mention, that from Calcutta alone the annual export is supposed to be very nearly four millions of pounds' weight.

The different kinds of shellac may be named as follows:—

Stick Lac.	Seed Lac.
Sheil Lac.	Lump Lac.
Button Lac.	White Lac.

Various shades of some of the above receive the names of garnet, liver, and orange. These are dependent upon the quantity of natural lac dye left in the seed lac before it is prepared, as will be immediately noticed. The five kinds first enumerated are imported; the last is prepared in this country.

Stick and seed lac require little notice. The former is the natural production of the insect already described, and the latter is the remains after the extraction of the coloring matter to form the lac dye. The small granular pieces of gum resin left are collected as free extraneous matter as possible, and dried in the sun. Button and sheil lac are the two descriptions most employed in this country, and are both prepared from the seed lac as follows:—The grains are placed in long sausage-shaped bags and heated before fires, until the liquid resin exuding slowly through the interstices of the cloth is scraped off, and immediately transferred to the highly polished surface of earthenware cylinders, heated by being filled with hot water. The melted lac is spread over these cylinders by men, women, or boys, who use for this purpose a palm leaf, and thus produce cakes about twenty inches square. It is then, when cool, thrown into chests, and by the transit becomes much broken ere it arrives in this country. The finest bright orange shellac is believed to be colored artificially, and I think correctly—having had occasion more than once to reject samples from their peculiar light yellow shade. Orpiment is thought to be the coloring matter employed.

Button, block, garnet, and liver lac, are all produced more or less carefully from different qualities of seed lac, the color and appearance depending entirely upon the districts from whence the seed lac has been obtained, and the completeness of the removal of the lac dye. Nothing more need be added as to the preparation of these lacs—and, indeed, I believe no further particulars are known. White lac is prepared in this country from ordinary shellac, by being first boiled in a solution of carbonate of potash, through which a stream of chlorine is then to

be passed. Hydrochloric acid is added, and last of all red lead. The white pulpy mass is then collected, washed, and pulled into sticks of different lengths. This description of lac is not much employed, being chiefly consumed in manufacturing the different light shades of fancy sealing-wax. Before proceeding to the closing part of these remarks—viz. the present commercial relations of this article—it may be stated that shellac should contain from 84 to 90 per cent. of resin alone, with varying quantities of coloring matter. When not carefully prepared, a quantity of sand is often present, which deteriorates the lac, and depreciates its value when used for varnishes, &c.

For about two years there has been a steady, but most unaccountable, rise in the price of all descriptions of lac. Thus, in October, 1858, the price in the London market, as well as in Liverpool, was 82s. per cwt. During the same month in 1859 it reached 123s. per cwt., and in October, 1860, it sold in the same markets at 260s. per cwt.; while in both the enormous price of £14 has, within the last fortnight, been obtained. At first sight, one is very apt to consider such extreme prices the result of speculation, but I have ascertained the last quotation from Calcutta, I mean in the market there, to be 57 rupees per maud. There are, I understand, 3 mauds to every 2 cwt., or a maud and a half to each 112 lbs.; so, allowing each rupee to be worth 2s. of British currency, we have the cost in India before shipment as £8 11s. The estimated expense of freight, &c., may be roughly stated at £2, which brings up the price on landing to £10 11s. This appears a very good margin for the importers. But it is said on pretty good authority that there are not at present fifty chests of really good, fine, orange shellac to be got in London. If this be correct, then the difference given above, between the net value as imported and the price realized here is not to be wondered at, nor can it be called excessive. It might, however, very naturally be asked, what is really the cause of such high prices and such scarcity? The most feasible reason, and I believe the true one, is that the native forests where lac has hitherto been found in such abundance, have suffered so dreadfully from the ravages and devastation of war, that the native collectors have failed entirely in obtaining supplies of the raw material. Now this is highly probable, for we know that

some of the largest lac factories are on the banks of the Ganges; but then in the more peaceful districts this reason cannot be considered tenable. I am somewhat inclined to suppose that there is really a natural scarcity in the jungle of the little lac-producing insect, and that these two causes, operating together, have brought about the present state of matters. One very incomprehensible thing is, that the prices of lac dye have not risen, and that there is a plentiful supply of this article in the market. This, of course, can only be accounted for in two ways—either, that the supply meets the demand, or that very large quantities have been stored up before the scarcity of lac began.

The quantity of all kinds of gum lac exported from Calcutta annually about eight years ago was supposed to be about 1800 tons, while, in 1858, it fell to about 700 tons, in 1859 about a fourth less, while during the present year the quantity has considerably increased. But in November, 1858, the stocks on hand in London and Liverpool were 3959 chests and bags; same month in 1859, 1316, and in November, 1860 (last month), 1345. Of these I cannot tell the relative proportions of orange, garnet, or livery. Of course, all descriptions are included. There are vessels, however, now afloat and expected to reach England in due course, having on board no less than 3192 chests and 363 bags of shellac, which, doubtless, if they do not sink to the bottom of the sea, ought to raise our home stocks, and tend to reduce prices; but we are told, on the other hand, that there is a large demand for the American and foreign market, while all our drug and other merchants at home are so bare of stock, that they will be ready to buy whenever the price moderates.

I dare say it must have occurred to more than one to inquire why, with such extravagant prices, some other substance or compound has never been thought of and introduced instead of shellac. This has been done, but most unsuccessfully. When in London, about eight months ago, I was shown an article which a company just established were about to make and sell instead of shellac. The price was £3 per cwt. cheaper, and those about to engage in its manufacture were sanguine as to the ultimate results. I was told, whenever it was ready to send out in quantity, a sample would be sent. Accordingly, about a month afterwards, a parcel arrived, regarding which my opinion was re-

quested. After carefully trying the article, I gave a report condemnatory of its use in any of the arts or manufactures in which the regular lac had hitherto been used. Although I was little thanked for this opinion at the time, I do not think the stuff I now show continued long to be made. Indeed, it really appears to be little else than a mixture of shellac and some aloetic resin, very probably Cape aloes. Be that as it may, I am satisfied from experiment that it could never come into competition with even inferior kinds of shellac.

In closing these few remarks, I may be allowed to express a hope, that lac has seen its highest price, and that during 1861 it will be considerably reduced. I am very unwilling to believe, that native supplies have really become extinct; while the enormous comparative prices still existing, cannot but tend to increase that activity and energy in searching for fresh supplies, which will, I trust, result in sending more raw material to the native lac manufactories, and thus by increasing stocks at home, gradually reduce the market price to something more moderate, and approximating the steady prices at which shellac has until lately stood on the price list.—*London Pharm. Journ.* Jan. 1861.

ON THE UNCERTAINTY OF COMPOSITION OF THE AQUA LAURO-CERASI.

By HARRY NAPIER DRAPER, F. C. S. L.

My object in this paper is to draw attention to the very uncertain constitution of cherry laurel water, and to the importance of providing some substitute in the shape of the much more stable hydrocyanic acid. Laurel water has on its side all the claim of antiquity, and I am aware that it is not easy to persuade the practitioner who has long been in the habit of prescribing any one remedy, to use another in its stead. I am also fully alive to the importance of caution in presuming upon the value of any therapeutic agent, solely from its chemical composition, seeing that we possess many very valuable remedies, about the constitution of which we either know nothing, or nothing which will serve to elucidate their mode of action. If, therefore, experience pointed out any difference in the effects of laurel water and of

dilute hydrocyanic acid, a proposition to substitute the latter for the former would be unjustifiable; but as it is the opinion of all who have written upon the subject that the action of the two remedies is in every respect the same,* if we become convinced that we gain an important advantage by the change we should certainly adopt it.

The aqua lauro-cerasi is not included among the formulæ of the London Pharmacopœia, but finds a place among those of the Pharmacopœias of Dublin and Edinburgh. The process for its preparation is in both of these essentially the same. One pound of fresh laurel leaves are digested in two and a half pints of water, and a pint of the liquid is distilled over and filtered. Laurel water as thus prepared is nothing more than a dilute solution of hydrocyanic acid, to which the presence of a small quantity of volatile oil gives its peculiar odor and taste. The dose is by no means well fixed, being given by some authorities at from ten minims to twenty minims, and according to others ranging from 3ss. to 3i.

The leaves of the cherry laurel have never been perfectly examined, but of the nature of two of their constituents there exists no doubt. These are—firstly, a volatile oil, resembling in its physical properties very closely that obtained from bitter almonds, and in chemical constitution agreeing with it in every particular; secondly, hydrocyanic acid. Both of these substances are, as has been already stated, held in solution by the distillate from the leaves.

The chief cause of the uncertainty of this preparation lies in the fact that the quantity of hydrocyanated oil obtained from the leaves varies with their age. Thus Christison found that 1000 grains of the buds and unexpanded leaves of May and June gave 6.33 grains of oil, but when they had in July attained their full size the same quantity yielded but 3.1 grains, while in the May following the quantity had diminished to 0.6 grains. Not only is the quantity of oil liable to variation, but what is still more important, the quantity of hydrocyanic acid which it con-

*According to Göppert, however, the poisonous action of cherry laurel water does not depend on the hydrocyanic acid which it contains, but upon some property peculiar to itself.

tains is uncertain. It is stated by some writers to contain 2.75 per cent. ; while according to others who have investigated the subject, it may exist in as large a proportion as 7.66 per cent. Christison confirms this discrepancy, he having obtained from developed young leaves twice as much acid as from old ones. Then, again, while it is well known that the leaves are constantly employed with impunity as a flavoring for articles of food, many cases have occurred in which serious results have supervened from their use in this manner. In a case cited by Dr. Paris, several children were nearly poisoned by eating a custard so flavored. Zeller states that the leaves gathered in wet cold weather yield more hydrocyanic acid than when they are collected in a hot, dry season.

From this collection of facts it will be seen that it is impossible for any two samples of laurel water to contain the same proportion of active constituents, but this is by no means the only source of error. Others which are no less conducive to uncertain composition creep in during the process of manufacture. As the whole of the oil comes over in the distillation with the first few ounces of water, if the whole product be not strongly agitated before filtration, a uniform preparation will not, even if other conditions be favorable, be obtained. Moreover, constant variations from the process given by the Pharmacopœias are frequently adopted to suit the conveniences of manufacture on the large scale. The most usual of these modifications consists in passing steam through a vessel containing the crushed leaves until the condensed vapor measures the proper quantity. More rarely it is prepared by agitating a known proportion of the oil with distilled water, as is practised in the preparation of the aromatic waters of the Pharmacopœia.

In addition to the above sources of inaccuracy, there is one other which has by no means attracted the attention which the importance of the question seems to me to deserve. It is this: Liebig and Wöhler, though unable in their analysis of laurel-leaves to detect *amygdaline*, concur in opinion as to its existence. If this be the case—and all analogy leads to the inference that it is—the well-known action by which this body gives rise to hydrocyanic acid should surely not be overlooked, as the duration of the digestion of the leaves in water, now considered as a matter of but secondary

importance, would then exercise considerable influence over the amount of active matter contained in the product. Closely connected with this part of the question are the results obtained by Pereira in experimenting on bitter almond oil. He found that a quantity of this substance which had been carefully purified, and in which he could not detect a trace of hydrocyanic acid, gave, after having been kept for a few months, distinct evidences of its presence. If we assume—as we can scarcely avoid doing—that an analogy exists between this oil and oil of cherry laurel, another condition of change is introduced, and an increase of hydrocyanic acid in the water must result from its being kept. Experiments in this direction are, however, still wanting.

My next step is naturally to inquire in what degree this inconstancy in the composition of laurel water, which we assume upon theory, is borne out by experience of its effects, and we find that here facts bear us out more fully even than before. A short summary of these facts will, while occupying less space than a more detailed account, at the same time illustrate the case more clearly.

Fonquier has given *twelve ounces* in the course of a day without any evident effect.

In 1781, Sir T. Boughton was poisoned, death resulting in half an hour by *two ounces*.

In another case, quoted by Taylor, *one ounce and a half* caused death in an adult.

Then as regards chemical analysis, Pereira (quoted by Taylor) gives the average strength as equal to a solution of hydrocyanic acid containing 0.25 per cent. Two samples which I have examined, and which were obtained from two of our first pharmaceutical laboratories, yielded respectively 0.011 and 0.009 per cent.; in fact, mere traces, the numerical value of which could not, but that large quantities were operated upon, have been stated at all.

Surely further evidence is not needed to show that this preparation is most inconstant, and that even if, on the one hand, no bad results often ensue from its administration; on the other, the practitioner must frequently experience much disappointment from the inactivity of a medicine which he believes to contain 12 per cent. of pharmacopœial hydrocyanic acid.

As it is not likely that in this country, where, from long usage, laurel water has become firmly established, the much more stable and reliable hydrocyanic acid will ever supersede it, I would suggest two methods by which the evil may be, if not wholly remedied, at least palliated, and the preparation at the same time be retained.

The first of these is, that as laurel leaves can be obtained at all times of the year, the preparation should be much more frequently made, and, when made, be standardized in the manner directed by the London Pharmacopœia for fixing the strength of its dilute hydrocyanic acid. In this way a uniform product, as far at least as the acid is concerned, would be obtained.

By the second method the pharmacist would be rendered independent of circumstances which might prevent fresh—and especially young—leaves being obtained, and moreover the proportion of volatile oil in the liquid, which by the first method could not be constant, would be always the same. I propose, then,—firstly, that the volatile oil be distilled from the leaves, and, by any of the well-known means, wholly deprived of hydrocyanic acid, the subsequent formation of which might be guarded against by keeping some peroxide of mercury in the bottle which contains it; secondly, that a fixed proportion of this oil be dissolved in distilled water, and that hydrocyanic acid of known strength be added to the solution in such quantity as to make it bear an easily remembered relation of strength to the dilute acid of the Pharmacopœia.

It is clear that the time for such a change will be upon the advent of the new Pharmacopœia; but by way of example, supposing that a dilute acid of 2 per cent. be decided upon, the following would be an advantageous formula for the preparation of *aqua lauro cerasi*:

Dilute hydrocyanic acid	.	.	.	35 grains.
Volatile oil of cherry laurel	.	.	.	5 “
Distilled water	.	.	.	4 oz.

This solution would contain 2 per cent. of hydrocyanic acid (which in its turn would contain 2 per cent. of real acid), or in the other words, 50 minims would be equivalent to one minim of dilute hydrocyanic acid. From the facility with which this water could be made, no valid excuse could be found for not

throwing it away when from any cause it had become deteriorated.—*Dublin Med. Press*, Dec. 4, 1860, from *London Pharm. Journ.* Jan. 1861.

ON ARNICA MONTANA, Linn.

By G. F. WALZ.

After stating the importance of arnica as a medicine, the author mentions the results of the investigations of the flowers by Weber, Martini, Gressler, Chevallier and Lassaigue, Thomson, Versmann, Bastick and Lebourdais, and the analyses of the root by Pfaff and Weissenburger; the herb has never been carefully analyzed. Having 100 lb. of the latter at his disposal, the author examined first for volatile oil, but obtained merely an oily film. The whole quantity of herb was exhausted with boiling water. The brown infusion has a slight acid reaction, is darkened by alkalies, and precipitated green by ferric salts, and yellow by salts of lead and other metals.

The infusion was precipitated by subacetate of lead, from the clear nearly colorless filtrate, the lead removed by carbonate of soda, and the decanted liquid precipitated by tannin. The precipitate is soluble in water; it was washed with little water, pressed, dried and treated with alcohol. The tannin was removed from the tincture by litharge, decolorized by animal charcoal, distilled, and the residue set aside. After several weeks, white felt-like crystals, sparingly soluble in alcohol and entirely tasteless, were separated together with some fat, which crystallized from hot alcohol at 12 to 15° C. (59° F.) in feathery, silky needles, drying to a fragile mass of faint, fatty odor, and fusing between 25 and 30° C. (77 and 86° F.) The above crystals were likewise obtained from the root and flowers, and will be noticed hereafter.

From the mother liquor, which possessed the acrid and bitter taste of the herb, no crystals separated on further evaporation, but water precipitated white floccules, gradually becoming a yellowish oily mass. The liquid was not precipitated by alkalies, but acids threw down a white oily mass; the same body was dissolved from the liquid by ether, from which it separated on

evaporation as white warty crystals, becoming soft and balsam-like by a gentle heat. This is the acrid body, named by the author, arnicine.—(N. Jahrb. f. Ph. xiii. 174.)

After the removal of the ethereal liquid, the aqueous liquor was turbid, and left on the filter a brownish mass, consisting of a resinous body, soluble in alcohol, and some of the above white body crystallizing from hot alcohol. The alcoholic solution, after removing coloring matter by animal charcoal, left on evaporation a yellowish-brown body, from which ammonia separated some arnicine, leaving the resin behind.

The aqueous filtrate was of a dark color, and a bitter and still acrid taste; oxide of lead removed much coloring matter, and on evaporation, a yellowish, very hygroscopic powder, of a bitter, acrid taste, remained behind. This was treated with absolute alcohol, which left gum and sugar behind. After distilling off the alcohol, the amorphous residue was treated with ether; on evaporating this solution a scarcely colored, very acrid, resinous body remained behind. It was dissolved by ammonia, from which solution a white, silky crystalline powder separated, which proved to be a wax.

The ammoniacal solution left the arnicine on evaporation, as an amorphous mass. Neutralized with muriatic acid, a turbidity, and afterwards floccules, appeared, which united, assuming a resinous appearance. This arnicine is sparingly soluble in water, but imparts to it its acrid persistent taste, and produces with tannin a flocculent precipitate. Its behaviour to reagents is as follows: bichloride of platinum, after some time, a yellowish-white precipitate; nitrate of silver, white voluminous; proto-nitrate of mercury, white bulky; terchloride of gold, yellowish-white, bulky; subacetate of lead, white; baryta, even in alcoholic solutions, crystalline; alkalies deepen the color. Acids produce on standing or boiling, a flocculent precipitate.

Arnicine deprived of all adhering moisture, is a golden yellow mass, which dissolves in alkalies, the solutions leaving on evaporation a sticky mass; the ammoniacal solution, however, pure arnicine. Sulphuric acid colors it yellowish brown, nitric acid produces a tough resin, hydrochloric acid dissolves it slowly, the solution becomes turbid on the addition of water. It contains

no nitrogen ; dried at 212° F. Three analyses gave the following results :

	Calculation.	Analysis.
70 C.	71.60	71.52
54 H.	9.20	9.23
14 O.	19.20	19.25

The author supposes arnicine to be a glucoside, and remarks that the analyses likewise agree very nearly with the formula $C_{45}H_{36}O_{10}$. Boiling with acids appears to yield several secondary products of decomposition.

Oil of Arnica.—The flowers contain little volatile oil of a yellow color, not blue as asserted by Martius.

Analysis of the flowers.—120 lb. of flowers several years old, were exhausted with boiling water, the infusion precipitated first with subacetate of lead, and after removing the lead, with tannin. The latter precipitate was exhausted with alcohol, the tannin removed by oxide of lead, and the crystals separating on cooling, freed from the solution by filtering and washing with water ; they were identical with the above oil. After distilling off part of the alcohol, the above mentioned wax crystallized, and the mother liquor now yielded with water a turbidity, and flocules of arnicine. The filtrate therefrom still had an acrid and very bitter taste ; it was evaporated and treated with absolute alcohol, which left a tasteless mass. This tincture was decolorized by animal charcoal, the alcohol distilled off, and the dry residue digested with ether. On evaporating the ether spontaneously, a yellowish, oily mass, of a bitter, acrid taste, was left intermixed with oblique rhombic prisms of acetate of soda.

On dissolving in alcohol, some scales of the fat and wax were left ; the solution was precipitated by water, leaving the acetate of soda in solution. After having distilled off the alcohol, tannin precipitates more arnicine, which is obtained pure by digestion with oxide of lead and subsequent spontaneous evaporation.

For preparing arnicine, Professor Walz recommends, besides the process just mentioned, the following :

1. The flowers are exhausted with ether, this distilled off, and the residue treated with alcohol of .850 spec. grav., which dissolves arnicine with little fat, to be purified by animal charcoal, and repeated solution in weak alcohol.

2. The alcoholic tincture of the flowers is agitated with animal charcoal, and the extract treated with ether, the solution is shaken with some liquor potassa to remove a resin, and then evaporated. The residue is treated with alcohol of .850, and further as before.

The author reviews then an inaugural essay by Erichsen in Dorpat: "De floribus Arnice Montanæ," an abstract of which is published in Cannstatt's *Jahresbericht* for 1858. He exhausted the alcoholic extract with ether, agitated the solution with solution of potassa, and evaporated the ether; the residue was treated with alcohol and the solution evaporated. The mass had an acrid and bitter taste like the flowers; dilute acetic acid dissolved the bitter principle, the acrid residue becomes tasteless when boiled with concentrated acetic acid; but this solution as well as that in dilute acetic acid, left on evaporation a radiating crystalline mass of very bitter taste, but destitute of the properties of arnica flowers. Erichsen concludes that the active principle is easily altered and has not been isolated yet.

Prof. Walz, on repeating the experiments of Erichsen, states that the crystalline bodies left after evaporating the dilute and concentrated acetic acid solution, are pure arnicine, mixed with some of his wax, while the tasteless substance is nothing but resin fat and chlorophyl.

The author found in the flowers, arnicine, yellow volatile oil, two resins, one soluble and one insoluble in ether, tannin, yellow coloring matter, fat fusing at 28° C., and wax. He is now occupied with an analysis of the root, when he will give more information about the properties of the various constituents. Professor Friedreich is investigating the medical properties of arnicine.—*N. Jahrbuch f. Pharmacie. Wittst. V. Schr.* x. 188–206.

ON THE VOLATILE OIL OF PINUS PUMILIO, Hænke.

By C. H. MIKOLASCH.

Mr. Mack, pharmacist of Reichenhall, obtains this oil in preparing the now much employed so-called pine leaf baths, by cutting and bruising the young branches with the leaves, and boiling them in a still with water. The limpid, light and pale

yellow oil was analysed in Buchner's laboratory by C. Mikolasch, and found to have many properties in common with the volatile oil, obtained from the twigs of *Pinus abies* freed from the leaves, which was analyzed a few years ago by Wœhler.

It has a very agreeable balsamic odor, widely differing from oil of turpentine, and merits, therefore, to be substituted in medicines for this less agreeable oil; being very thin, it is well adapted for embrocations. Visitors to the baths at Reichenhall take this oil along to their homes, and sprinkling it into their rooms, are thus enabled to inhale in winter, and at their own firesides, the balsamic air which they found so strengthening in the Alps.

The crude oil has a specific gravity of .893 at 17° C., and boils at 152° C. Iodine acts less energetically than upon oil of turpentine, and atmospheric oxygen is not so strongly ozonized as by the latter. By rectification it is obtained colorless, but its odor is not improved. By treating it with potassa, and repeatedly with potassium, it became thicker and dark brown; the distillate from this in an atmosphere of dry carbonic acid, had the composition of oil of turpentine, a specific gravity of .875, much altered, less agreeable odor, and turned at 20° C., and with a column of 25 centimetres polarized light 18° to the left; the oil merely rectified with water turned it 16°. It absorbs much hydrochloric acid gas, and increases nearly one-third in its volume, without separating a solid compound. Freed from the excess of acid, it was a yellowish liquid of an agreeable odor, resembling oil of thyme, and had the composition $C_{20}H_{16}$, HCl. No solid sublimate was obtained by heating it after Berthelot's method with fuming nitric acid.

The volatile oil obtained as above, of *Pinus pumilio*, consists of an oxygenated portion, and of one carbohydrogen of the composition of oil of turpentine.—*Buchner's N. Repert.* ix. 337-345.

J. M. M.

ON OXYACANTHIN.*

BY CHARLES WACKER.

The author gives a condensed account of the investigations of G. Polex (Archiv d. Ph. 2 R. vi. 265), Kemp (Buchn. Rep. lxxi. 166), and Wittstein (Präparatenkunde 595), the latter having observed it in a Mexican species of *Berberis*.

About 2 lb. of the precipitate produced by carbonate of soda, in the mother liquor of berberina, were treated with dilute hydrochloric acid, filtered and precipitated by ammonia. The precipitate was washed with water, dried, powdered and exhausted with ether, which was evaporated, the extract left behind was redissolved in dilute hydrochloric acid, and now yielded with ammonia an almost white precipitate. This was converted into the hydrochlorate, a portion of which was obtained in colorless crystals, which yielded with ammonia a purely white precipitate. The colored hydrochlorate was obtained colorless by recrystallization.

The residues from the treatment with ether was darker brown than the original precipitate, and weighed only about one-eighth less; its taste was bitter; its solution in acids yielded the same precipitate with alkalies. It appears to be the alkaloid combined with a tannic acid, the former of which was partly liberated by treating with carbonate of soda and exhausting by ether.

Properties of the alkaloid.—It is a white powder, remaining unaltered in the shade, but turning yellow in the direct sunlight, the solution of the latter in acids, yielding it white again on supersaturating with alkalies. Under the microscope it appears as amorphous globules, but crystallizes from concentrated alcoholic and ethereal solutions in fine colorless needles and prisms. Its taste is purely bitter, not very persistent. It fuses at 139° C., is decomposed at a higher heat, and burns upon platinum foil without leaving any residue. Alcohol dissolves much of the

* Berzelius proposed for this alkaloid the name *berbina*, to distinguish it from berberina, and indicate its occurrence in *Berberis vulgaris*. Mr. Wacker now suggests the name *vinetina*, derived from *vinetier*, the French name for barberry.

alkaloid, but separates a part in needles, which require 30 parts cold, and 1 part boiling 90 per cent. alcohol for solution; the cold solution has a bitterish taste and slight alkaline reaction. The crystals require 125 p. cold and 4 p. hot ether for solution. It is freely soluble in chloroform, and with the aid of heat in fixed and volatile oils.

It yields with concentrated sulphuric acid a clear, somewhat yellowish solution; with nitric acid a brownish yellow solution, separating warty and needle-shaped crystals; with chromate of potassa and sulphuric acid, gradually chromic oxide; and with chlorine water, a yellow solution, becoming darker, not turbid, with ammonia; from iodic acid it liberates iodine.

The neutral hydrochlorate gives with alkalies a white precipitate, soluble in excess and in much ammonia; with alkaline carbonates, a white permanent precipitate; with nitro-picric acid, a lemon-yellow precipitate, readily soluble in an excess, in alcohol, acetic, nitric, muriatic and sulphuric acids, and in much water; with tannin, a yellowish white turbidity; with iodide of potassium, a white, and in the presence of free iodine, a brownish yellow permanent precipitate; with sulphocyanide of potassium, white permanent floccules; with ferrocyanide of potassium, white; with the ferrid cyanide, sulphur-yellow; terchloride of gold, yellowish; bichloride of mercury, white, fine floccules, soluble in water; with bichloride of platinum, pale, greyish yellow; with proto-nitrate of palladium, brownish yellow, nearly orange colored; and with phosphomolybdic acid, a yellowish white precipitate.

The alkaloid loses 1HO at 100° C., and consists then of $C_{32}H_{23}NO_{11}$.

	Calculated.	Formed by 4 analyses.
32 C.	60.568	60.264
23 H.	7.256	7.526
N.	4.416	4.514
11 O.	27.760	27.696

The equivalent is 3962.5 (O=100; or 317, H=1), which is corroborated by the platinochloride, which contains in 7.5 grs. 1.4108 gr. platinum.

Salts.—The hydrochlorate dried at 100° C. contains 4HO, and is readily soluble in alcohol and water, and crystallizes in

white warts. The sulphate is anhydrous at 100° C., and otherwise resembles the former. The two following salts are less soluble in water; the nitrate contains 4HO , and crystallizes in warts and needles; the anhydrous oxalate appears in needles. The acetate could not be obtained in crystals.

The military surgeons, Dr. Broxner and Dr. Ettinger, are now trying its medicinal effects.—(*Wittst. V. Schr.* 177–188.)

J. M. M.

NOTE ON FRENCH OPIUM.

By M. H. LEPAGE, PHARMACIEN.

For some years past, many persons, amongst whom it is but right to place foremost M. Aubergier, of Clermond-Ferrand, have been engaged in the collection of opium, one of the most precious drugs of the *Materia Medica*.

If the different species or varieties of the genus *Papaver* yield opium, all do not produce it in equal quantities. Thus, the white officinal poppy, the pink poppy, and the purple poppy, upon which experiments have been especially made, must be arranged in the following order as regards their produce: 1, the white poppy; 2, the purple-brown poppy; 3, the pink poppy. On the other hand, the opium obtained from these different poppies must be classed as follows, according to their richness in morphia: 1, opium from the pink poppy; 2, that from the purple; 3, that from the white officinal poppy. Thus, whilst the opium from the pink poppy yields from 14 to 23 per cent. of morphia, that of the white poppy never contains more than from 5 to 8 per cent. As to the opium from the purple poppy, which appears to be that in which the quantity of morphia varies the least, it yields from 10 to 12 per cent. These facts result from the united experience of MM. Aubergier, Decharmes, Bénard, O'Reveil, and Mialhe. (See *Pharmaceutical Journal*, vol. ii., series 2, page 229.)

With such results, I ask myself, if the collection of opium is a work which may really be put in practice without much trouble, why pharmacutists who are placed in favorable situations, as most are who live in small towns, do not take upon themselves

this cultivation, were it only for their own consumption? For my part, I set to work and have obtained, as you see below, various satisfactory results. I began my experiments in 1857, and repeated them in 1858 and 1859. It is the brown-purple poppy that I cultivate, as yielding opium in which the proportion of morphia varies the least, and also that in which the proportion is similar to that which the best foreign opium used in pharmaceutical preparations should contain. Here is the summary of my proceedings:—

In soil well manured, in March, from the 1st to the 15th, I sow in rows, 25 centimetres apart (nearly 10 inches), my poppy-seed mixed with a little sand; I then roll it, and when the plant is well up, that is to say, in about four or five weeks, the weeds which have sprung up between the rows, and which must injure the development of the young plant, are cut away; a little later, towards the 15th of May, it is necessary to weed with the hand, an operation which not only destroys the weeds, but also helps to thin the poppy plants, for these latter are always too thick, whatever precaution may be taken in the process of sowing. The weeding ended, nothing remains to be done until the time for collecting the opium, which takes place generally from the 8th to the 15th of July.

Moreover, if it is important not to wait until the capsules begin to turn yellow before the incisions are made, it is equally so not to begin on capsules yet too green, unless you wish to see the juice, yet too thin, run down and partly be lost. Experience will very soon show when it is time to begin the work; but at this point the operations must be conducted judiciously, for when the poppies begin to turn yellow, the juice flows scarcely at all. The laticiferous vessels being at the circumference of the capsules, a superficial incision is sufficient to reach them, whilst an incision which would penetrate within the capsule would permit a portion of the juice to flow into it, and would thus diminish by so much the produce. More than this, it would cause a disappointment in the loss of some of the seeds when the capsule was ripe. The incisions should be circular rather than perpendicular. The same capsules may be incised two or three times, with an interval of twenty-four hours, and will supply each time a fresh quantity of opium.

A good operator may collect 100 grammes of opium in a day, but more frequently only from 70 to 80. A method of accelerating the operation consists in one person making the incisions whilst another takes away the juice; in which case, it is well that the person who incises should be at least an hour at his work in advance of the one who collects, so as to give the opium juice time to partly harden on the capsule.

The juice collected each day should immediately be spread in thin layers upon plates, and placed in a spot heated to 86 or 95 degrees, in order to dry it quickly,* and when the gathering is over, the whole is mixed in a marble mortar, and produces a paste of sufficient consistence to form into cakes of from 50 to 100 grammes each. These latter are further dried in the open air. It is in this way that we obtained the opium which we sent in 1859 to the exposition of Rouen.

I found, in the opium of my gathering of 1857, by the excellent process of M. Fordos, 12.50 per cent. of morphia; M. Réveil, however, to whom I sent a sample, could find but 11 per cent., following the same process. The opium of this year's gathering has produced me 11.50 per cent.

After the collection of the opium, that of the capsules must be attended to when they are ripe, in order to remove the seeds, which yield a valuable fixed oil.

I subjoin a table of the cost of the opium which I gathered in 1859:—

	fr.	cen.
Rent of 8 ares (about one-fifth of an acre), at 2 fr. per are	16	0
Manure	10	0
Labor	6	0
Sowing	10	0
Weeding	5	75
Expenses of collecting the opium	21	75

Total 69 50

Produce obtained:—500 grammes of opium; 48 kilogrammes

* According to M. Bénard, if the opium juice be dried too slowly, a part of the morphia which it contains is transformed into another substance.

of seed, which have furnished 17 kilogrammes of oil, in value 27 fr. 20 c. There remain then 42 fr. 30 c. for the 500 grammes of opium.—*Echo Médical de Neuchâtel* and *Journal de Pharmacie d'Anvers*.

PURIFICATION OF VEGETABLE JUICES.

Presented to the French Academy of Sciences, January 14, 1861.

BY M. EMILE ROUSSEAU.

In the saccharine juices of vegetables, that of the best not being taken as an example, there are found two kinds of organic substances, which must interfere with the extraction of the sugar.

The first belongs to the group of albuminoid and caseous substances. It undergoes all the modifications which reagents produce on solutions of albumen and casein. The salts of lime and lime itself coagulate it; but the latter, whether by its proper alkaline action it dissolves a portion of the vegetable substance and retains it in combination as was lately shown by Frémy, or because it sets free some potassa or soda, causes the saccharine juices treated by it to remain always alkaline, after the action of carbonic acid. These two effects are often united, and an ulterior alteration of the syrup takes place, which is recognized in the commonest kinds of sugar.

The second substance is colorless ordinarily, as long as it remains in the cellules of the vegetable, but very greedy of oxygen, coloring rapidly under the influence of air, suffering modifications rapidly from the action of oxidating agents, so that it is entirely converted into the well known substance which is produced, when vegetable juices are evaporated or entirely destroyed. This substance, when deprived of albuminoid matter, reduces, with the aid of heat, the salts of silver, protoxide of mercury, &c. Through the action of this latter body the solution takes the same color which the juice acquires by long exposure to the air.

The facts being established, the problem, how to simplify the fabrication of sugar may be stated thus : wanted (1) a substance of slight solubility, capable of coagulating all the albuminoid substances, without any injurious action either upon the sugar or upon health, capable of ready withdrawal from the juice in

cases where it had been retained to a certain extent in solution, and finally procurable at low cost; (2) another substance possessed of a (so to speak) limited oxidating power, which, by its own action, could destroy the coloring substance, or transform it into the brown substance and absorb it then,—which, in a word, could unite the qualities of innocuousness and absorbent action required in the substance first referred to, and be had at a low cost.

Sulphate of lime, whether natural or artificial (crude or boiled plaster), is, of all bodies which I have studied, best fitted to meet the first indications. It is neutral—an essential condition—has no action on sugar, and is of very slight solubility; it unites to the conditions of innocuousness and cheapness, the most remarkable coagulating effects on the albuminoid substances contained in the vegetable juices, especially in that of the beet. This property is such that its solution even answers, in amount relatively very small, to produce the effect. The operation of defecation can be executed under excellent conditions and with very little of the substance; the scum becomes very consistent, collects well, and the juice may be readily strained in a condition of suitable limpidity. Sulphate of lime removes then perfectly all coagulable substances, but it does not touch the coloring substances, so that the juice after the separation of the scum soon becomes very deeply colored.

Animal black is almost without effect immediately after defecation; it only removes the substance that has already oxidized, and after its action, the juice whose color has been greatly diminished, is not slow in becoming again colored. An oxidizing body is required which is able to effect in a very short time that which the air effects but slowly, or which shall have the power of destroying or absorbing the substance. Hydrated sesquioxide of iron presents most the advantageous properties of all that I have examined.

After all the coagulable substances have been removed from a saccharine juice, if it be agitated in the cold, or at a temperature which must never be as great as that of ebullition, with hydrated sesquioxide of iron, the filtered liquor will come through perfectly colorless and purified from the entire presence of all the foreign substances which it contains. Moreover, the sesquiox-

ide of iron, on account of its property (well known to chemists) of absorbing alkaline and earthy salts, removes the small quantity of the sulphate of lime which was left in the solution. Thus, the juice which, after defecation by sulphate of lime, reduced nitrate of silver, protoxide of mercury, &c., will produce no alteration in these, after its own contact with oxide of iron.

The juice, when it proceeds from a vegetable taken in a normal condition, is perfectly neutral to test paper, after this purification, and may be preserved in contact with the air for several days, without its undergoing the slightest alteration or coloration, which proves that all the substances capable of acting the part of a ferment have been removed. It can be boiled, without coloring under the action of the heat. The syrup carried to the point of candying possesses only the slight yellow color peculiar to all the purest syrups. Its taste is pleasant, devoid of that saline and disagreeable taste which is found in the syrup of the beet, and it preserves a remarkable fluidity and limpidity. It crystallizes readily, the crystals being white.

As the last proof of a good purification of saccharine juice in this way, if we add to some of the boiled syrup a sufficient quantity of water so that the areometer could stand at from 25° to 30° , and then mix it with a large excess of alcohol of 90, there will be produced neither turbidness nor deposit after days standing,—showing that not a trace of air is present.

Henceforward the manufacture of sugar is reduced to the following manipulations: to heat the saccharine juice in a boiler along with a few thousandths of sulphate of lime (crude plaster is the best), all the coagulable substances will collect in a compact scum: the clean juice is then agitated with the sesquioxide of iron. After the separation of the sesquioxide, it only remains to evaporate the water, that is to say, to boil it.

The form of hydrated sesquioxide of iron which seemed most fitted was that of a consistent paste. A litre weighs about 1.145 grm., containing from 70 to 80 parts to 100 of water. The quantity to be employed varies with the nature of the vegetable, its own condition and state of preservation. It should not exceed, as the extreme limit, 8 to 10 parts to 100 of juice,—which amounts to about 2 parts to 100 parts of solid substance, the remainder being water.

After it has been employed with defecated sugar, it assumes a color almost black, contracts and readily separates from the liquid. When it has been kept on hand, it is only necessary to wash it in warm water,—after having exposed it for some time to the air, so as to give the organic substances that it has entrapped time to be destroyed,—in order that the deoxidized portion may regain oxygen from the air in the place of that which it has lost. Its employment, as appears, is for an indefinite length of time,—and expense of a very insignificant character is required for its revivification. The happy property of indeterminate regeneration removes all questions as regards the amount employed.

I would add that heretofore its price has been much less than that of animal black, as it can be obtained from 5 to 6 francs for 100 kilogr., and the price will undoubtedly be reduced in the future.

It will be understood that nothing is herewith proposed, based on means more or less empirical, nor upon the action of machines more or less ingenious, whose effects are subordinated to variable conditions or changes; it rests on determinate chemical relations, so precise that they furnish the explanation at the same time that they give certainty. Sulphate of lime and sesquioxide of iron will remove foreign substances from sugar, and are inferior to no other substances in this respect.—*Cosmos*, from *Journ. and Trans. Md. Coll. Pharm.* June, 1861.

L. H. S.

PREPARATION OF BONES FOR USE.

The best and cheapest method of preparing bones for manure is, first, to boil them in strong ley a few hours, to extract from them the animal matter, or what would be more convenient, perhaps, break them as fine as convenient, and put them in a tub of ley to remain there during pleasure, until the animal matter is all extracted and incorporated with the ley. The mineral part of the bones will now be found very friable and easily pulverized. They should be rinsed clean, pulverized, and put into another tub or trough. Apply to them some diluted sulphuric acid, in the proportion of one of acid to five of water.

Stir them frequently, and in a short time, they will be entirely decomposed and fitted for use. These two masses, being equally rich in the elements of fertility, the one of ammonia and the other of phosphorus, are equally valuable as fertilizers, and adapted to any and every variety of soil that may be deficient in these elements, and equally necessary for the healthful maturity of every growing plant, whether of grain, grasses, fruits, or roots. I now advise a mixture of these two masses with the general compost, to secure a general diffusion of them upon the different fields to be manured. My reason for the general diffusion of these masses, upon the different fields is, first, every plant needs them. Secondly, the farmer's resources, in this line, will be mainly within himself. This will be true of those that live at a distance from villages and cities. Their resources must be small. Thirdly, the elements of the bone, both animal and mineral, were taken from the different fields, and should, therefore, be returned to the same fields. To keep up the fertility of each field, it is necessary to return to it annually the same elements that are taken away. The farmer may secure a larger crop of any kind, on any field, by robbing other fields of the same elements of fertility to enrich that one. But such a policy would not only be bad, but ruinous if pursued.—*Druggists' Circular, from Country Gentleman.*

CARBONIC ACID IN THE SOIL.

Van den Broek says (*Annalen der Chem. und Pharm.*, Bd. cxv. s. 87) that a solution of carbonic acid percolating through the soil, is, up to a certain limit, robbed of its carbonic acid, so that the filtrate no longer causes any turbidity with lime-water; and, if a stream of hydrogen gas be passed through a layer of earth, the carbonic acid can be displaced. The author lays stress on this property of the soil holding carbonic acid, as supporting Liebig's views on the subject of the nutrition of plants.—*Chem. News, London, March 16, 1861.*

(Continued from page 376.)

the water. One of the constituents often then remains in the form of microscopic crystals or as an amorphous powder, at least for a short time, undissolved, and can be separated from the other bodies easily and quickly soluble in water by a rapid filtration.

We will now apply our attention to the *precipitates* which are thrown down by a solution of alum and ammonia from a portion of the watery decoction.

The *precipitate* washed on the filter with water is treated with *dilute sulphuric acid*, and allowed to remain some time in contact with the same, accompanied with frequent stirring. For this purpose, the precipitate on the filter is introduced into a capacious glass vessel. The solution is filtered from the portion remaining undissolved, and this is washed on a filter with water. The residue washed with water is treated with *hot alcohol*, wherein such substances dissolve. These can be precipitated from the alcoholic solution by *water*, and after being washed with water, may be preserved for a closer examination by being dried *in vacuo* over sulphuric acid.

The solution obtained by the application of dilute sulphuric acid is mixed with a saturated solution of sulphate of potassa, whereby the alum is reformed, and at the same time is partially precipitated. The fluid is mixed with *anhydrous alcohol* as long as an addition of the same produces a precipitate of alum and sulphate of potash, and the spirituous liquid is filtered from the precipitate. The quantity of sulphuric acid which is still present in the fluid in a free condition is separated by the introduction of moist *white lead*, prepared by passing carbonic acid into subacetate of lead. The sulphate of lead is separated by a filter, and the small quantity of lead dissolved removed from the liquid by sulphuretted hydrogen. After filtering off the sulphuret of lead and expelling the sulphuretted hydrogen, the alcohol is distilled off and the watery residue employed for further investigation. It is self-evident that the greatest portion of the substances contained in this fluid are those which were precipitated by sugar of lead and subacetate lead from a portion of the watery decoction, with the exception of those which are not precipitated with alum, or remain undissolved by the treatment of the aluminous precipitate with dilute sulphuric acid. This fluid is therefore treated exactly as is above described with the first portion of the watery decoction—namely, with sugar of lead and subacetate of lead, and the resulting precipitates are examined in precisely the same manner.

It was mentioned before that a part of the watery decoction was to be treated with animal charcoal, and the charcoal washed with water and extracted with boiling alcohol. This alcoholic extract may contain coloring matters, indifferent bitter principles, organic bases, &c. After its evaporation, either *crystals* are separated which can be removed from the mother liquor, or no crystals are formed. The whole residue, where no crystals have separated, or the mother liquors from which the crystals have been

removed, must now be subjected to a more minute investigation. The examination of the mixtures of substances which are contained in the fluids which are filtered from the precipitates produced by acetate and subacetate of lead in one portion of the watery decoction, and from the precipitates caused by alum in a second portion of the same, is facilitated when the former are freed from lead by sulphuretted hydrogen, and the latter from sulphate of potassa and ammonia by alcohol, and then distilling off the alcohol. Organic bases, many bitter bodies, and other substances, will likewise be contained in those fluids, as well as in the alcoholic extract of the animal charcoal. *The concentrated residue of this alcoholic extract is diluted with water.* Should a body difficultly soluble in water be thereby thrown down, it should be collected on a filter. A small portion of the watery fluid is now mixed with a *solution of sugar of lead* by which a precipitate often results, because coloring matters and other bodies possessing the character of weak acids, afford, with lead, insoluble compounds. The *fluid filtered* from the precipitate resulting from sugar of lead is mixed with *subacetate of lead*, to observe whether a precipitate thereby ensues or not. If a precipitate results, it is separated by a filter from the fluid, and this is freed from lead by sulphuretted hydrogen, the sulphuretted hydrogen expelled, and the fluid evaporated to ascertain whether a residue remains, which is generally not the case, as sulphuret of lead frequently retains the bodies which were taken up by the charcoal from the watery solution. On this account the sulphuret of lead must be extracted with hot alcohol, and the hot liquid filtered from the sulphuret of lead in a hot-water funnel. *Both precipitates* resulting from sugar of lead and subacetate of lead are *boiled with alcohol* to ascertain whether they dissolve partially or entirely in alcohol. The solutions, if resulting, are treated with sulphuretted hydrogen, the sulphuret of lead heated to the boiling point with the spirit, and filtered hot. In the spirit with which the precipitate which resulted from subacetate of lead was heated, an organic base, or a mixture of several such bodies, may possibly be detected. *The portion of the lead precipitate remaining undissolved in boiling alcohol* is diffused through alcohol, decomposed by sulphuretted hydrogen, the fluid heated with the sulphuret of lead, and filtered hot. These different fluids are evaporated in a water-bath, and the residues preserved for further examination with reagents.

Having spoken of the treatment of the precipitates which are produced by sugar of lead and subacetate of lead in one portion of the watery decoction, and by alum and ammonia in another portion, and described the treatment of a part of the watery decoction with animal charcoal, we will now direct our attention to the liquid *residues* which have been obtained by the methods already related *from the watery decoction after treatment by the two salts of lead or alum and ammonia, and after the substances precipitated by these means have been separated from the lead by sulphuretted hydrogen, and the sulphate of potash and ammonia by alcohol.*

It was mentioned previously that sometimes *crystals* will separate from the *residues*, which by the evaporation of the water or the spirit are left behind, and that these crystals should be removed from the mother liquors from which they have separated.

When the crystals have been separated from the mother liquors, *their degree of solubility* must first be ascertained. That they are soluble in water is evident from their method of preparation, although they may be difficultly soluble in water. The presence of other substances in the watery decoction may considerably increase their solubility in water. If the same crystalline mass had had formed from the residues which were obtained from the watery decoction by the salts of lead as from the residues which remained after the treatment of the watery decoction by alum and ammonia, it results that this crystalline mass, which may be one body or a mixture of several substances, is quite as soluble in *alcohol* as in water, because, had it been insoluble in alcohol, it would have been left behind on separating the sulphates of potash and ammonia by anhydrous alcohol, with these sulphates as an insoluble body. It still remains to be ascertained whether the crystalline mass is quite or partially soluble in *ether*, as well as whether *acidulated water* dissolves more of it than pure water. When the degree of solubility has been learnt by these experiments, a method is afforded which had to be found to purify the still impure crystals by recrystallization before they are further investigated.

We first ascertain, with a very small quantity of the *crystals purified by recrystallization*, whether they can be partially or entirely sublimed or not, altered or unaltered. The experiment, which gives in most instances a negative result, can be performed between two small watch glasses fitted to one another.

To arrive at the nature of these crystals, we proceed further, in the following manner:—

We first ascertain whether an organic base, or a mixture of several organic bases, as an acetate or acetates, is contained in the crystalline mass. To detect these bodies, a portion of the separated crystals is employed, and this is divided into four equal parts.

The *first part* is dissolved in the smallest required quantity of water, and a few drops of hydrochloric acid are added to the solution, then *bichloride of platina*. If no precipitate ensues, a little anhydrous alcohol is added, and then if no precipitate results, a small quantity of ether. The resulting precipitate (if any) is separated by a filter from the fluid, and washed with a mixture of anhydrous alcohol with a little ether. The dried precipitate is tested, to ascertain whether it contains potassa or not, by heating it to redness, and extracting the platina residue with water, and testing for the potash therein, which must be present as chloride of potassium if the crystals contained potash. It is well to examine the portion of crystals employed, to learn their capacity for sublimation, to ascertain whether the residue generally remaining will burn completely, and, when it leaves an ash, whether potassa is present therein.

The *second part* of the solution is mixed with a solution of *bichloride of mercury*. By this means there are several bases precipitated—for example, emetia, &c.

The *third part* of the solution is mixed with a concentrated solution of *caustic soda* in very small quantity. If the crystals were the acetate of a base difficultly soluble in water, or if they contained a little of one or several such salts, the base would be precipitated from its concentrated solution by the alkali, after the neutralization of the acetic acid. In an excess of the alkali, the precipitated base is frequently more soluble than in pure water, therefore the alkali must only be added by drops. Instead of *caustic soda*, carbonate of soda can be employed.

The *fourth part* of the solution is *heated after the addition of an alkali*, and it is ascertained whether the vapor thereby evolved is alkaline. Such a vapor may result when a volatile base is present whose acetate is crystallizable, or when the crystals were, or contained a body analogous to, asparagine; in the latter case, ammonia is evolved under the given conditions.

According to researches of Sonnenschein, phosphor-molybdic acid is a good test to prove the presence of bases. It gives with all bases, almost without exception, precipitates as well with the oxygenated as the non-oxygenated ones; these are generally yellow, but sometimes colored brownish yellow. This compound is prepared by precipitating molybdate of ammonia with *c* phosphate of soda, suspending the well-washed precipitate in water, and heating it with carbonate of soda, until it is completely dissolved. This solution is evaporated to dryness, and then heated to redness, for the complete expulsion of the ammonia. If the molybdic acid is thereby partially reduced, the heated residue is moistened with nitric acid, and again heated to redness. The resulting dry saline mass is heated with water, nitric acid is added to produce a strong acid reaction, and then with so much water mixed, that ten parts of the solution contain one part of the dry saline mass. This golden yellow fluid, after filtration, must be preserved, excluded as much as possible from the influence of ammoniacal vapors.

If we have found by this examination whether basic bodies are present or not, it is necessary, in the case of bases being present, to ascertain *whether one or more bases are at the same time present*.

Many vegetable substances contain only a single base. The berries and leaves of coffee contain only *caffaina*, the berries of cocoa only *theobromina*, &c. But in cinchona bark, *quinia* and *cinchonina* are present; in the *strychnæ*, *brucia* and *strychnia*, besides another base. The *papaveraceæ* contain at the same time three or more bases.

By the investigation of the degree of solubility, the opportunity has in many cases been given to learn whether we have to do with one or several bodies. To arrive at certainty on the point, the following method of examination is preferable to all others, which is founded on a discovery made

by Persoz, and first recommended by C. Oppermann as a method for separating several bases from one another :—

The concentrated aqueous solution of bases is mixed with *tartaric acid*, and then *bicarbonate of soda* is added. Oppermann has found that by this method of treatment quinine, morphine, and brucine are not ; on the contrary, cinchonine, narcotine, and strychnine are, precipitated. Thus, in many cases when two bases are present, a separation of one from the other may be effected by this method. By mixing the fluid filtered from the precipitate which may have been produced by bicarbonate of soda with a little hydrochloric acid, and then adding bichloride of platina and alcohol, it can be readily determined whether a base still remains in the solution or not.

If we learn by this treatment that several bases are present, we must still ascertain *whether the precipitated part and the non-precipitated part consists of one or more bases*. The examination depends on the principle of *fractional precipitation, and the estimation of atomic weights which are undertaken with the individual portions of the precipitated bases*. For the performance of the examination thirty or forty grains of the substance to be tested is necessary. The part of the solution precipitable after mixture with tartaric acid by bicarbonate of soda is first separated from the unprecipitable part and collected on a filter, then dissolved in dilute hydrochloric acid, and half the quantity of the solution of bicarbonate of soda is added which was required to throw down the entire quantity of bases. This quantity should be previously ascertained with small measured quantities of the solution of the bases and bicarbonate of soda. It is evident that the hydrochloric acid solution of the bases must be quite neutral—that is, must contain no excess of acid.

The substance separated by the first half of the precipitant, and the precipitate produced by the second half of the same, are collected on filters and washed, then dissolved in dilute hydrochloric acid, and mixed with bichloride of platinum and alcohol. Both the platina precipitates are washed with alcohol mixed with ether, dried, and heated to redness.

From the quantity of platina remaining behind, it will be seen whether one or more bases are present. A closer examination with reagents whose behaviour to bases is known, may first be performed with good results when the separation of the different bases has been thus approximately attained.

If we have by these means learnt that the separated crystals are not an organic base, or a mixture of such bases, or rather their salts, with acetic acid, they must be therefore an indifferent organic body, or rarely a mixture of several substances of that kind. The presence or absence of nitrogen—that is, the presence or absence of a body perhaps analogous to asparagine—has been already decided by the experiment with the concentrated solution of caustic soda in the heat.

The preponderating majority of these indifferent vegetable substances

has been proved by careful investigation to belong to the class of copulated carbohydrates—as, for example, salicine, phloridzine, populine, arbutine, ononine, æsculine, &c. It is, therefore, our problem to ascertain whether the crystals in question belong or not to this class of bodies—that is, whether by acids (when these do not act in a too concentrated form at high temperatures) they are split into two products, one of which—a carbohydrate—is in the majority of cases sugar, or a similarly composed body. By the action of alkalis on these bodies, two products likewise result—one which is in exceptional instances sugar, but in the majority of cases a carbohydrate, with properties different to those of sugar. Frequently the salt of an acid results, and a product which is decomposed by acids into two products, one of which is sugar.

To ascertain whether a copulated carbohydrate of that kind is present, the crystals under examination are treated in the following manner:—

They are dissolved in the smallest possible quantity of water, and the solution is mixed with a small quantity of *strong hydrochloric acid*, the acid solution is introduced into a flask, and the air drawn out by a stream of carbonic acid gas. The flask is heated on a sand-bath until its contents boil. To intercept the volatile products of decomposition perhaps evolved, the flask is connected with a refrigeratory apparatus and a receiver. In many cases while heating, and in others after cooling, the fluid boiled for some time deposits a product of the decomposition sometimes in the form of distinct crystals, sometimes in the form of amorphous flocks, or in a state of powder. Occasionally a dense oily or resinous mass is deposited, which sometimes, after long standing, becomes crystalline. When an *insoluble* or difficultly soluble decomposition product is separated after the fluid has cooled, this is collected on a filter. It is advisable to cool the fluid down to 32° Fahr., to effect thereby a more complete separation. The filtered acid fluid is then mixed with freshly precipitated moist *carbonate of lead*, until, upon the addition of this salt, no more effervescence takes place. The solution containing the chloride of lead in solution, together with the undissolved chloride of lead is poured into a basin, heated on a water-bath, and in small portions *freshly prepared or still moist white lead* is added. A basic lead salt of very slight solubility results. As soon as by the addition of a fresh quantity of white lead no more change is remarked, the contents of the basin are placed on a filter. The filtered fluid is mixed with *phosphate of silver*, which is prepared by precipitating a solution of phosphate of soda of the Pharmacopœias with a solution of nitrate of silver, and which is preserved *in a moist state*, excluded from the light. As soon as the phosphate of silver and the dissolved chloride of lead come into contact with one another, they are decomposed into insoluble chloride of silver, and into insoluble phosphate of lead. The phosphate of silver is consequently added until the yellow color of the silver salt no longer disappears; the precipitate in the fluid thus assumes a yellowish color. The fluid is filtered from the precipitate, which is washed. The filtered fluid, together with the

small quantity of washings, is mixed with pure white lead into a paste, and gently heated for a short time. The white color of the milky fluid begins to pass into a reddish grey by the decomposition of the phosphate of silver, which is soluble in a small quantity in water. The fluid filtered from the insoluble contents is freed from a trace of lead by sulphuretted hydrogen, separated from sulphuret of lead by filtration and evaporated in a water-bath. If sugar has formed by the treatment with hydrochloric acid, it is obtained as a syrupy sweet mass, which crystallizes after standing some days, but requires occasionally some weeks.

When, by the treatment with hydrochloric acid in the heat, *no decomposition products insoluble or difficultly soluble* have separated, and in the receiver furnished with a refrigeratory apparatus, *no volatile products* are to be found, then either no decomposition has ensued, or *both the decomposition products are easily soluble in the water containing hydrochloric*. To discover whether soluble decomposition products have been produced, the acidulated fluid is mixed with dry carbonate of lead as long as effervescence results by the addition of a fresh quantity of the carbonate. The hydrochloric acid has a decomposing action on the carbonate of lead, and forms chloride of lead under the development of carbonic acid. The decomposition products of indifferent copulated compounds do not attack, in the cold, carbonate of lead in the majority of cases, because a strong organic acid seldom results from the decomposition of these bodies. Only in the heat do these bodies decompose carbonate of lead. On the contrary, they decompose more readily the freshly precipitated moist carbonate of lead, or that preserved in a pasty wet state after precipitation. The chloride of lead is filtered from the liquid, and thus much hydrochloric acid is separated. The fluid is now concentrated in a water-bath, whereby, especially after cooling, the greater part of the chloride of lead contained in the fluid separates. The separated chloride of lead is filtered off, dried, after it has been well pressed between bibulous paper frequently renewed, and now heated to learn whether it is mixed with an organic substance, which is generally not the case. Should an organic lead compound be admixed with chloride of lead, it is ascertained whether it can be extracted with alcohol from the chloride of lead, wherein the latter is insoluble. When the organic lead compound is not soluble in alcohol, the chloride of lead mixed with the organic lead compound must be decomposed under water by sulphuretted hydrogen, by which means the organic substance and hydrochloric acid are obtained in the fluid filtered from the sulphuret of lead. A small quantity of this fluid is mixed with *baryta water*, to ascertain whether, besides chloride of barium, which remains in solution, a baryta compound of the organic substance, insoluble in water, results. When this is the case, the solution containing chloride of barium is filtered from the baryta compound, which is washed with water, and the organic body which was combined with the baryta, that is, the pure decomposition product, is obtained by decomposing the baryta compound with dilute sul-

phuric acid. As chloride of barium is almost insoluble in quite anhydrous alcohol, and the majority of the baryta compounds of organic substances, on the contrary, dissolve with great difficulty in weak spirit, we can, when baryta water produces no precipitate in the hydrochloric acid fluid, add absolute alcohol, whereby a baryta compound of the decomposition product is often thrown down before the chloride of barium separates.

It is self-evident that the fluid containing hydrochloric acid, which is obtained by heating the aqueous solution of the crystals under examination with a little hydrochloric acid, may be mixed with baryta water, to observe whether a precipitate, that is, a compound of the decomposition product, insoluble in water, is thereby formed or not; in the latter case, the addition of a little anhydrous alcohol assists the precipitation. If a precipitate is not produced either by baryta water alone, or by baryta water and alcohol, a second portion of the fluid, containing hydrochloric acid, is taken and mixed with freshly precipitated *carbonate of silver*, which is converted into insoluble chloride of silver by the hydrochloric acid, under the evolution of carbonic acid. The chloride of silver is separated by filtration from the fluid, which is now free from hydrochloric acid. Two cases can hereby happen. Either there results, besides the chloride of silver, the silver compound of a decomposition product insoluble in water or not. If no insoluble compound of a decomposition product with silver, has separated with the chloride of silver, the filtered fluid contains silver or not. If it contains silver, the silver must be separated by sulphuretted hydrogen; then we have a watery solution of both decomposition products. If it does not contain silver, the filtrate is a pure solution of decomposition products. Of their further treatment we shall directly speak. When a decomposition product is precipitated, together with chloride of silver, as an insoluble silver compound, and filtered off, the filtered fluid is a solution of sugar, or a solution of a carbohydrate with the same composition as sugar. When the solution of both decomposition products is obtained in a condition free from hydrochloric acid, we must endeavor to effect a separation with *bichloride of tin*, or with *basic acetate of lead*. Many of the decomposition products appearing with sugar are precipitated by bichloride of tin, and most of these bodies are thrown down by basic acetate of lead. The tin and lead compounds obtained may be decomposed by sulphuretted hydrogen, after they have been diffused in water. The fluid filtered from these tin and lead compounds, after treatment with sulphuretted hydrogen, can be employed for obtaining the sugar.

If the research which has been made with both portions of the fluid under examination has lead to no result, a third portion of the fluid, containing hydrochloric acid, is taken and mixed with a solution of *sulphate of silver* as long as a turbidness arises from precipitated chloride of silver. The chloride of silver is removed by filtration, the fluid containing sulphuric acid is mixed with baryta water as long as sulphate of baryta separates, and by filtration a solution of both decomposition products is obtained free from acid.

Varities.

Arnica Hair Wash.—When the hair is falling off and becoming thin from the too frequent use of castor, macassar oils, &c., or when premature baldness arises from illness, the arnica hair wash will be found of great service in arresting the mischief. It is thus prepared :—Take elder water, half a pint; sherry wine, half a pint; tincture of arnica half an ounce: alcoholic ammonia one drachm—if this last named ingredient is old, and has lost its strength, then two drachms instead of one may be employed. The whole of these are to be mixed in a lotion bottle, and applied to the head every night with a sponge. Wash the head with warm water twice a week. Soft brushes only must be used during the growth of the young hair.—*The Druggist.*

Blackberry Wine.—To make a wine equal in value to port, take ripe blackberries, press the juice from them, let it stand 36 hours to ferment (lightly covered,) and skim off whatever rises to the top; then, to every gallon of the juice add 1 quart of water and 3 lbs. of sugar, (brown will do;) let it stand in an open vessel for 24 hours; skim and strain it, then barrel it. Let it stand 8 or 9 months, when it should be racked off, and bottled, and corked close; age improves it.—*The Druggist.*

Insects in grain.—A French commission, appointed to examine into the means of destroying insects which prey upon grain that is stored up, have reported that a small quantity of chloroform or sulphuret of carbon put into the interior of a grain pit, and then hermetically sealed up, will destroy all the pests. About 75 grains of sulphuret of carbon are sufficient for about four bushels. Grain placed in a heap, and covered with a tarpaulin, may be effectually treated thus to destroy such insects.—*The Druggist.*

Crayons or Drawing Chalks—The civilizing influence of art is constantly improving the taste of the people. Color, pattern, and design must now pervade all our manufactures, to keep pace with the improved judgment of purchasers as to true beauty. Nothing tends to advance art more than making drawing one of the common branches of education, and few materials will render drawing more popular than the colored chalks or crayons as made by Messrs. Joel, of Paris, which are prepared thus: Take three-quarters of a pound of blue clay, three-quarters of a pound of the coloring required, such as vermilion, chrome, Prussian blue, orpiment, &c., two ounces of turpentine, four ounces of spirits of wine, and six ounces of fine shellac. The clay must be well mixed with water, passed through a fine lawn sieve, and allowed to subside; the water is then poured off and

the clay dried. The shellac must be dissolved in the mixed turpentine and spirit with a little warmth. The dried clay and the coloring must be now well blended in a mortar, and then the shellac mixture added and well incorporated till the whole is a doughy mass: it is then to be rolled out into pencil form and dried with stove heat. To make the crayons of uniform substance, the paste may be placed in a cylinder, with a hole at one end and a piston at the other, (like a boy's pop-gun), the "wormy" pieces that pass through are then cut into proper lengths and dried.—*Sep-timus Piesse*.

A new Caustic for Toothache.—The following treatment is recommended by Dr. Calvy, of Toulon, for the neuralgia proceeding from carious teeth. The carious cavity is first to be cleaned out, and then a piece of cotton, steeped in a solution of six grains of acetate of morphia in an ounce of nitric acid, is to be applied to its interior. As soon as the caustic penetrates into the carious tooth, the pain ceases, and the patient is cured. After the application of the caustic, the cavity should be filled with cotton steeped in the sedative solution of opium, and afterwards permanently plugged.—*Br. Med. Journ. from Gaz. des. Hôpitaux, Jan. 10, 1861.*

Juice of Chelidonium Majus has been locally applied with the most satisfactory results in cases of greatly itching eczema, injuries from nettles, and other itching diseases of the skin, by Grand-Clement (*Bull. de Thérap.* lvi., p. 336). Mixed with an equal quantity of glycerine, it can be preserved and used for the same purpose at times when the fresh plant cannot be obtained.—*London Pharm. Journ. July, 1860.*

Ferri Carbonas Effervescens: a New Form of Chalybeate.—Dr. T. Skinner, in a communication to the Dublin Medical Press, recommends the following formula for preparing effervescing carbonate of iron:—

R Acidi Tart., $\bar{\text{z}}$ ij.
 Sodæ Bicarbonatis, $\bar{\text{z}}$ v.
 Ferri Sulph., $\bar{\text{z}}$ x.
 Pulv. Sacchari, $\bar{\text{z}}$ j. $\bar{\text{z}}$ vj.
 Acidi Citrici, $\bar{\text{z}}$ ij.

1. Mix the sulphate of iron with the sugar and part of the tartaric acid.
 2. Mix the citric acid with the remainder of the tartaric acid and the bicarbonate of soda. 3. Add the mixtures, and thoroughly incorporate them by sifting. 4. The whole is now to be thrown into a metallic pan set in a water-bath; in a few minutes it will separate, when it should be rapidly stirred until granules are formed. If preferred, it may then be flavored with oil of lemon; hitherto, however, the preparation has been without it.

When the above is carefully prepared, it has all the appearance of the popular and well known granular effervescent citrate of magnesia, with the

addition of a slight yellowish green tint. Every drachm and a half contains ten grains of sulphate of iron, which, with a complement of bicarbonate of soda, is certain to produce, in a state of solution, four grains of nascent protocarbonate of iron.—*London Pharm. Journ. Aug.*, 1861.

New Test for Diabetes.—This test consists in the conversion of the saccharine element of diabetic urine into caramel by heat.

The following is the mode of applying it:—

Upon a clean slip of tinned iron place one or two drops of the suspected material, and hold it over a spirit lamp: the fluid will speedily evaporate, leaving, if the process be arrested at that point, scarcely a trace upon the metallic surface. Continue the application of heat; in a few moments after the desiccation is complete, a spot of an inch or so in diameter, over which the drops spread with the first ebullition, will gradually assume a rich reddish-brown color, with a brilliant lustre, as if coated with a film of Japan lacquer. A solution of sugar, not diabetic, exhibits almost exactly the same reaction.—*London Pharm. Journ. Aug.* 1861.

Manufacture of Pure Phosphoric Acid.—Dr. J. Neustadt publishes (*Dingler's Polytech. Journal*, Bd. clix, s. 442) an “improved method of making pure phosphoric acid on the large scale.” The process involves the preparation of phosphate of soda from bone ash, the formation of phosphate of baryta from this, and the subsequent decomposition of the last by sulphuric acid. In the first place, one part of finely powdered bone ash is mixed with four parts of water and one part hydrochloric acid. After standing six hours, the clear liquid is poured off, and to it is added a boiling solution of sulphate of soda. The sulphate of lime is allowed to deposit, the liquor is poured off, and the precipitate washed and pressed. The liquor decanted, which contains acid phosphate of soda, chloride of sodium, and some sulphate of lime, is now boiled with carbonate of soda and rendered neutral, and then filtered from the precipitated carbonate of lime. We have now a neutral solution of phosphate of soda, and chloride of sodium, to which is added just enough of a hot solution of chloride of barium to precipitate the phosphoric acid in the form of phosphate of baryta. Twice the weight of the bone-ash operated on, the author says, is the quantity of chloride of barium required. After washing, the phosphate of baryta (prepared from one part of bone-ash) is mixed with one part of sulphuric acid diluted with three parts of water, and stirred occasionally for two or three days, until no sulphuric acid is found in the liquor, which is then strong and pure phosphoric acid.—*Chem. News, London.*

Editorial Department.

PHARMACEUTICAL EDUCATION.—In times like the present, when the regular routine of Society is threatened with convulsion, and the arrangements of to-day may be soon altered by the pressure of circumstances, it behoves the rising generation to avoid, as far as possible, the evil results by securing a business education, fitting them to meet the exigencies which may surround them on their entry into manhood. This education becomes an indestructible capital, ready at all times to aid the possessor. The able mechanic, the thorough book-keeper, the earnest physican, and the qualified pharmacist, are much more likely to find employment than the pretender or half educated. Especially is the truth of this in pharmacy illustrated every day by the difficulty of procuring well qualified clerks for *responsible* positions. So long as a clerk holds a subordinate position, there are many imperfections which may be submitted to whilst he is constantly associated with an abler hand; but where the whole guidance of a business devolves on a clerk, it is expected that he will be able not only to meet the ordinary demands on his knowledge, but that he will be capable of acting in all the emergencies arising at the counter. The pharmaceutical student cannot too earnestly attend to the details of the shop—fortunate, if he be placed with an employer the scope of whose business, and the arrangements of whose shop, are such as to afford a wide range of experience, and ample means of preparation. With a clear sense of the importance of knowledge derived from College instruction, we are quite sincere in the belief that it will not substitute the practical tuition of the Counter and Laboratory, which, indeed, it is intended to illustrate and extend rather than to replace. But the apothecary who has had his education solely at the counter, though generally well posted in the practical part of his profession, and, where his duties included the manufacturing of preparations, shows an aptitude towards mere routine, yet he is often greatly perplexed by chemical impediments in processes that are as Greek to him in the absence of book knowledge and study. When, however, he is able to combine the theoretical instruction of the College with the practical duties of the shop, the student is in the position best calculated to educate himself thoroughly: the difficulties which arise in practice are cleared up and explained or remedied where possible, new methods are suggested, and like a mariner with a compass, he is not afraid to strike out into the obscure or unknown where he has chemistry as his friend and guide.

The season for study is approaching, and unfavorable as are the times

for pecuniary outlay, young men will find it capital well invested to urge on their studies, and accomplish the task of graduation, without risking its postponement to a distant opportunity which to them may never offer. Many instances occur to us where great regret has been expressed that this important professional accomplishment had been neglected, when, in after business-life, the advantages of a diploma have been urged by its necessity as a certificate of qualification.

PROGRESS OF THE BRITISH PHARMACOPOEIA.—In the August number of the *Pharmaceutical Journal*, we find the following Report of Dr. Garrod, Secretary of the Pharmacopœia Committee, having the Revision of the Pharmacopœia in charge—by which it will be seen that, although nearly ready for the press, it will not be issued in October as was anticipated last winter. The interest felt by many pharmacæutists and physicians in the early completion of this work, induces us to copy the report in full. It exhibits an outline view of the manner in which the revision has proceeded.

The British Pharmacopœia.—At a meeting of the General Council of Medical Education and Registration, held on Tuesday, July 2, the following Report of the Secretary of the Pharmacopœia Committee was read:—

“During the period which has elapsed since the meeting of the General Council of Medical Education and Registration in 1860, the three divisions of the Pharmacopœia Committee has persevered in their labors, and the manuscript of the British Pharmacopœia is approaching completion, and will very shortly be ready for press, as will be seen in the following report, which, with co-operation of Dr. Aquilla Smith, of the Dublin; and Dr. Charles Wilson, of the Edinburgh Committees, I am now enabled to lay before the Council:

“In order that the exact state of forwardness of the work may be correctly understood by the Council, it will be well to give a short sketch of its construction.

“It is divided into two parts, with an Appendix.

“Part I. contains a list of the *Materia Medica*, in which all the substances employed as medicines are inserted, and appended to each is its origin, with its definition, principal characters, tests for purity, and an enumeration of its officinal preparations.

“Part II. contains the various groups of Galenicals,—as extracts, infusions, tinctures, ointments, &c., with the methods of preparing each; likewise the processes for making the numerous chemicals described in the first part of the work.

“The Appendix includes the substances employed, not as remedies, but only in their preparation; and likewise the various test solutions to be used in ascertaining the strength and purity of drugs.

“One-third of the work has been allotted to each section of the Committee, and the portion framed by any one has been transmitted to the other two Committees, commented upon, and afterwards revised by the original Committee, and again recommended upon; all undecided points are then reserved until the final general meeting of the delegates of the Pharmacopœia Committee.

“Part I. is necessarily the least complete, as a knowledge of all the preparations in Part II. is required before its final adjustment.

"Dr. Wilson thus reports from the Edinburgh Section:—"The list of the *Materia Medica* allotted to its share is nearly, if not altogether, complete, and will soon be transmitted to the other Committees;" and Dr. Aquilla Smith states, that 'Descriptions of the Drugs derived from the vegetable kingdom have been drawn up by the members of the Committee, but they cannot be completed until the Galenical Preparations are definitely settled and printed.' Professor Harvey, the Botanical Referee, is engaged in preparing his report, which will shortly be completed. Of the Chemical Preparations in the list of the *Materia Medica*, the formulas of the numerous preparations of iron have been printed in No. 8 of the Proceedings of the Committee, and circulated amongst the members of the three Branch Committees. The preparations of mercury were sent to Dr. Wilson, the secretary of the Edinburgh Committee, in April, 1861, and all the remaining chemical substances have been reported upon and approved of by the Committee.

"The London Committee has constructed its third of the list of the *Materia Medica*, and likewise nearly all the processes for the chemicals attached to that portion, and is now having a fair copy prepared for transmission to the other Committees.

"Part II. The three sections of the Committee have framed all the groups of Galenical Preparations; the whole have been commented upon, and most of them revised, and either transmitted or about to be immediately forwarded for final comments.

"It has been agreed by the three sections, that a General Meeting of Delegates from each shall be held in Edinburgh the first week in next September, in order to adjust any differences which may remain, and to make arrangements for the printing and publication of the work, which it may be seasonably hoped will be accomplished by the end of the present year.

"The Council will be enabled to appreciate the labor of compiling the *British Pharmacopæia*, and the cause of its somewhat tardy appearance, when it is stated that every preparation contained in the work has been made, often repeatedly, and each process practically examined; and it is the hope of the Committee that the *British Pharmacopæia* will be found worthy of the sanction and approval of the General Council.

"A. B. GARROD, M. D., F. R. S., *Secretary*.

"84, Harley street, Cavendish square, July 1, 1861

OUR THANKS are due to Dr. Hartmann, of Cleveland, for the translations on the "Adulterations of Musk," and "some Species of *Helleborus*," at pages 426 and 427.

Subscribers to this Journal, who are in arrears, will oblige the Treasurer of the Publishing Committee by giving their earliest attention to the liquidation of their dues. Though not instituted as a financial agency, this Journal, until lately, has more than supported its expenses, but owing to the lopping off of a large number of its subscribers at the South, and the depressed condition of monetary affairs, it is likely to become a burthen on the College, unless its just dues are paid in by the subscribers.

Transactions of the Medical Society of the State of New York for the year 1861. Albany: Charles Van Benthuysen, Printer, 1861; pp. 408, 8vo.

We are indebted to Dr. Edward R. Squibb for the above Report, but it was received too late to notice several papers contained in it which have some bearing on the subjects discussed by this Journal, and we may take another opportunity of recurring to them.

OBITUARY.

JOSEPH LAIDLEY.—It will be remembered by those familiar with the graduating class of the Philadelphia College of Pharmacy of 1850—a class which, though small in number, was rather remarkable for the ability of its members—that Joseph Laidley, was among them, and by no means the least brilliant. Entering upon his apprenticeship as a Pharmaceutist with the late celebrated firm of Smith & Hodgson he continued with them and their successors, Bullock & Crenshaw, until 1850. Soon after this period he obtained a clerkship with Messrs Adie & Gray of Richmond, Virginia, at a liberal salary, and, we are informed, introduced a new era into their establishment as regarded its manufacturing department. Several years since Mr. Laidley commenced business in Richmond in partnership with Mr. Edward Robinson of that city, from which firm he subsequently retired, and last year opened an establishment on his own account in the same city. About six weeks before his death, we are informed that he advertised to prepare detonating powder for military purposes, which offer appears to have brought him to the notice of the authorities, as at the time of his decease he was in the employ of the Confederate Government at their cartridge factory.

Mr. Laidley is said to be of Irish parentage. Several years since he married a lady of Nelson County, Virginia, who survives him. Our last interview with him was last spring, some time before the secession of Virginia, and he had evidently made up his mind to cast his fortunes with the South in the event of a disruption of the then existing relations. As a pharmacist, the subject of this notice was able, and capable of original investigation, but more marked for the boldness with which he advocated his views than by accuracy in their demonstration. He formerly was a valued contributor to this Journal, the pages of which bear testimony to his industry, in the 25th, 26th, and 27th volumes. At one period Mr. Laidley was an active member, and one of the Vice-Presidents, of the American Pharmaceutical Association, of which he became a member at its organization in 1852, at Philadelphia, but for the last five years he has ceased to take any public interest in the advancement of Pharmacy. Owing all that rendered him efficient as a man, as well as a chemist and pharmacist, to his northern education and connection, it was hardly to be expected that he would have voluntarily aimed a blow at his country, and in the very act

be visited by so terrible a fate, as is detailed in the following extract from a Richmond paper.

"Horrible Catastrophe.—Mr. Joseph Laidley, the well known chemist, came to an untimely, sudden and horrible death about 20 minutes to one o'clock yesterday, by the explosion of a quantity of detonating powder, which he and an assistant named Robert Clayton, of Manchester, were preparing for the use of the Confederate Army, in a building erected especially for their use on an eminence in rear of the State armory, and equidistant between that and 'Thomas' Factory, where cartridges are now being fabricated for the Government. At the hour above named an explosion was heard resembling the discharge of a six-pounder. On repairing to the place a scene of rare horror met the gaze. The wooden out-building, and the interior one in which the powder was manufactured, were found blown down, and many of the timbers wrenched, twisted and broken in a manner to show the almost inconceivable power of the powder. Mr. Laidley was found lying on his back, one of the most horrible objects of mutilated humanity which it is possible to conceive. Within a few yards of the body was found a portion of the poor man's brains, looking as if they had been torn by a superhuman agency from the skull and splashed upon the floor. The entire head, except the lower jaw, had been blown off, and nothing remained to mark the features of a man, except a pair of whiskers and a portion of the neck. The right arm was torn off below the elbow, and from the bloody stump hung the fragments of nerves, veins and sinews which were left behind. The hand was afterwards found about two hundred yards from the place of explosion, in the yard of the State Armory, a portion of the face was likewise found (it is said) three hundred yards distant, near the banks of the river. The search for the remainder proved unavailing.

As soon as the facts became known a large number of persons collected, among whom were several of the Masonic fraternity, of which he was a member. These gathered up the remains and conveyed them to a house in the rear of 'Thomas' factory, where a metallic coffin soon after arrived, and the body was prepared for burial.

His assistant, Mr. Clayton, was found in a reclining posture against a post, doubled up as if he had suffered a fearful contortion. He was perfectly insensible, and so remained up to a late hour last night, but it was not ascertained to what extent he was internally injured. Drs. Wellford and Conway were summoned to the scene immediately after the accident, but their efforts proved unavailing to afford relief.

Among the rumors connected with this melancholy affair, was one to the effect that deceased had been seen going towards the laboratory smoking a cigar. Several persons declared that they saw him going thither smoking, a short time before the explosion was heard. It is said that he was not in the habit of smoking. It is certain, however, that a cigar was found in the pocket of his coat, which he had pulled off and hung on the wall of the interior room, where it remained until after the explosion.

Our latest information is to the effect that the fulminating powder was not sufficiently wet. Its manufacture is not dangerous when proper care is taken."

THE
AMERICAN JOURNAL OF PHARMACY.

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NOVEMBER, 1861.  
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MEETING OF THE BRITISH ASSOCIATION AT MANCHESTER,
SEPTEMBER 4, 1861.

(Extracts from a letter from an American gentleman, attending the Sessions.)

The first regular session was held in the evening, at the Free Trade Hall, at 8 o'clock, when the meeting was opened by the President of last year, Lord Wrottesley, who, in a short and appropriate speech, took leave of the Association in his official capacity, and, in very laudatory terms, introduced the new President, William Fairbairn, Esq., LL.D., F.R.S., &c. Mr. Fairbairn read his address. The audience, which included many ladies, could not have numbered less than two thousand, many of whom were unable to procure seats; and from the size of the room very many could not hear the speaker. While the President was speaking, a number of pages carried around his printed address among those who could not hear: so that they could, at least, by reading, become acquainted with the nature of the speaker's remarks. It may be stated in reference to the address, that, though in point of delivery and diction not remarkable, it nevertheless possessed much interest from the value of the facts and observations contained in it.

A man may be, as Mr. Fairbairn seems to be, an excellent engineer, of great natural genius, and profoundly versed in mechanics, both theoretic and applied, without being either a good speaker or a remarkable writer. He stands high among the mechanical philosophers of Manchester, perhaps at their head.

Sept. 5th. On this day the business of the Sections began. Of these there are eight; 1, Mathematics and Physics; 2, Chemistry; 3, Geology; 4, Zoology and Botany; 5, Physiology;

6, Geography and Ethnology; 7, Economics and Statistics; and 8, Mechanics. At the reception room every morning, a printed programme of the day's proceedings is presented to each member, so that he may make his choice among the sections; but, as it often happens that interesting papers are read at the same time in different sections, it is impossible to hear all that may be desired. The reading of papers begins at 11 o'clock, A. M. Our correspondent, wishing to hear the address of Sir Roderick I. Murchison, who presided over the geological section, attended punctually at the hour; but every seat was filled, and even the galleries crammed, so as to be inconvenient even for standing. He next went to the chemical section, and arrived in time to hear the last words only of the address of Professor Miller, of King's College, London, who presided.

A report next followed on the *Chemical Manufactures* of South Lancashire, of which Manchester is the business centre. It gave the statistics of these manufactures, but was devoted more especially to an account of the improvements in them which had taken place within the last ten or twelve years. This was the part of the report which especially attracted attention, and a few of the points touched upon are here noted:

1. Platinum retorts have generally been abandoned in South Lancashire in the distillation or concentration of sulphuric acid, large glass retorts having been substituted, which are now made of a quality so good as to be perfectly safe and admirably adapted to the purpose. The Report stated that the acid is obtained more free from color when distilled from glass, than from the metallic retorts. Unless, however, the quality of the glass retorts should be decidedly superior, the value of this substitution is likely to be less, now that a process has been discovered by which platinum can be readily melted and worked in large quantities, which should reduce the cost of the retorts made of this metal.

2. In the manufacture of sulphuric acid, some now use, as the exclusive source of the sulphurous acid, a material which has been employed in the purification of coal gas, it being a form of sesquioxide of iron, which, in the purifying process, is used over and over again, until it becomes so sulphuretted by the absorption of sulphur from the gas, as to contain forty per cent. of

that element. The chief interest attached to this new application is the utilization of a waste disagreeable product which otherwise would be a nuisance.

3. In making bleaching powder or *chlorinated lime*, chloride of chromium has been to a considerable extent substituted, as the source of chlorine, for the black oxide of manganese and common salt.

4. The *aluminous shale*, found in contact with coal strata, is now very much used in South Lancashire in the manufacture of alum. The shale is calcined to destroy the bituminous and coloring matter, and then treated with sulphuric acid and the ammoniacal liquor of gas works simultaneously; as it is not necessary first to form the sulphate of alumina and then to add the ammoniacal liquor, if care be taken that the mixture, when added, should have a decided excess of acid. As much as 110 tons a week are now made by this process, equal, the reporter said, to more than one-third of the whole of the alum made in England.

5. *Sawdust* has to a great extent been substituted for pieces of wood, in the manufacture of pyroligneous acid, on economical grounds.

6. A new process for *oxalic acid* has almost entirely superseded the old one of acting on sugar or starch by nitric acid. It is based on the fact that this acid results, in large quantities, from the reaction between caustic alkalies and certain organic substances. The substance chosen is sawdust, which is treated by a mixture of two equivalents of soda and one of potassa. It has been found that a mixture of the two alkalies is essential to the proper working of the process; but the reporter did not seem to understand precisely why. The alkalies had been tried separately, and were not found to answer. A concentrated solution is formed of them, with which the sawdust is mixed to the consistence of a thick paste, which is then spread in thin layers on iron plates, and gradually heated to 400° F., at which temperature it must be kept for an hour or two. The heat must not exceed this. A dark brown mass is thus produced which is soluble in water. Besides oxalic acid, some formic acid is produced, but very little acetic. Some manipulation here followed, which our correspondent failed to record, and after it the mass

is again heated as before. It now contains from 28 to 30 per cent. of oxalic acid, which exists combined with the soda, and probably also with the potassa. The mass is then treated with water which dissolves out everything, except the oxalate of soda, which is a comparatively insoluble salt; and this insolubility is probably the cause why, on the addition of water, the oxalate of potassa and the soluble soda salt, of formic and acetic acids, interchange their constituents, so that the relatively insoluble oxalate of soda is produced. The oxalate of soda is decomposed by carbonate of lime, producing oxalate of lime, which is then, finally, treated with sulphuric acid. Two pounds of sawdust yield a pound of oxalic acid.

7. *Garancin*, a product resulting from the action of sulphuric acid on madder, and which has been substituted to a great extent for madder itself in dyeing, is produced to the amount of 1200 tons per annum in South Lancashire. All the madder colors are obtainable from garancin, except the *pink*, for which the dyer requires the root itself.

8. The *anilin* coloring salts are largely prepared for use in dyeing.

9. Considerable quantities of *murexide* (purpurate of ammonia,) are now prepared from *guano*, and used in dyeing. It produces splendid purples, of which specimens were shown to the members.

In the evening a grand soireé was given at the Free Trade Hall, attended by a numerous throng of ladies and gentlemen, with a display of a vast number of things, illustrative of all the kingdoms of nature, and most of the branches of art; from a Whitworth's gun, which was breech-loading, and would carry a 12 pound ball six miles, to a series of bird's eggs, which appeared sufficiently numerous to be counted by thousands.

Sept. 6th. In the evening, Prof. Miller gave a lecture, by invitation, to the members of the Association, forming an audience of nearly 2000, upon a subject of much interest,—the spectrum analysis of Messrs. Bunsen and Kirchoff. The lecture was clear, well delivered, and admirably illustrated. It has long been known that, when the rays forming the solar spectrum pass through a slit instead of a round opening, the spectrum itself is traversed, at right angles, by a great number of black

or dark colored lines, parallel in position, but of various dimensions, and irregularly distributed. Another fact known for some time is, that bodies, rendered intensely luminous by a great heat, also form spectra, each of which is peculiar, so as to characterize the body. One substance yields one color of special brightness; another, another; and the shape, size and relative position of these strips of color are also characteristic. A third fact in the series is that a substance which, when intensely heated, gives a peculiar color of special brightness, absorbs that same color at a lower temperature; in other words, a body gives out, at a high heat, the peculiar light it absorbs when at a lower one. Hence, if a substance, in the form of vapor, be made to intervene between the source of light and the solar spectrum, it produces a dark line in the same position, and exactly of the same shape and size as the luminous line which characterizes it in its own spectrum. Still another fact is, that any of the metals, if put between the poles of a suitable galvanic battery, or other sufficiently powerful electric arrangement, may be brought to such a luminous condition as to yield characteristic spectra; and thus, an exceedingly easy method of experimenting, for the detection of metals, is afforded. Each of the metals yields a peculiar color, and all the salts of the same metal the same color, probably because all of them are reduced to the metallic state by the intense heat.

Now, what may be considered as an almost sublime result of these premises is, that we are enabled to analyze the atmosphere of the sun itself. The dark lines of the solar spectrum may be, in some degree, owing to the absorbing influence of substances in the outer layer of the sun's atmosphere, intervening between the central source of light and the eye. Some of these dark lines correspond exactly with the luminous lines of certain known bodies, as sodium, iron, &c., and may, therefore, in accordance with the above data, be ascribed to the vapors of these bodies in the outer solar atmosphere. It is said that, in relation to sodium, the correspondence is so entirely precise, that the inference is irresistible. But (says our correspondent) why should not the presence of sodium in space, or in our own atmosphere, have the same effect? and so in relation to all other metals; for the quantity requisite to produce the effect is

miraculously small. It is presumed, however, that a source of fallacy, so obvious, must have been guarded against; though nothing was said, so far as heard, on this point in the lecture. The stars also yield spectra; and, perhaps, it is by the absence of precisely the same dark lines in these, that their peculiarity, as observed in the solar spectrum, must be referred to the sun itself, and not to the space in which he moves, or to our atmosphere.

Another great advantage of this discovery of the peculiar spectra produced by the metals, is that it may be applied to the purposes of analysis, so as to detect the presence of these bodies in proportions far too minute to be detected by the ordinary methods. The new metals, *cæsium* and *rubidium*, were discovered in this way, and afterwards obtained in a separate state by the ordinary processes.*

Sept. 7th.—This morning, at the physiological section, Dr. Davy, the brother of Sir Humphry, presided, and read a paper in opposition to the popular notion of the *sudden* change of the color of hair from black to gray, or even white, under the influence of strong emotions. There were two other papers read before this section; one by Dr. Lionel Beale, on the ultimate constitution of the body, considered in reference to its microscopic constituents, which was highly interesting; and a second by Dr. Richardson, of London, on the subject of resuscitation, of which the most important point was that, judging from very numerous experiments of his own, galvanism should never be used as a substitute for artificial respiration; because, though it may bring muscles into play, it soon exhausts them, and renders them insusceptible to the ordinary physiological influences.

In the evening there was a grand *soirée*, the chief amusement at which was the sending and receiving telegraphic messages, first to and from different towns in the United Kingdom, then successively to and from Paris, St. Petersburg, Moscow, and even Odessa. It appeared that not more than two or three

* Those of our readers who feel disposed to look further into this extraordinary discovery, will find a figure of the apparatus used by Bunsen and Kirchhoff, and a more detailed account of their process, at page 224 of the May number of this *Journal*.—*Editor Am. Journ. Pharm.*

minutes intervened in receiving answers even from the remotest points. No doubt every thing had been pre-arranged, so that, at each point, a person was ready at the precise moment.

ON THE RESINS AND AQUEOUS EXTRACT OF JALAP.

BY JOHN C. LONG.

(An Inaugural Essay.)

The plant (*Ipomea jalapa*) has been so fully described in every systematic treatise upon *Materia Medica*, since Dr. J. R. Coxe, formerly Professor of *Materia Medica* in the University of Pennsylvania, decided authoritatively the question relating to the origin of the plant furnishing the jalaps of commerce, that here a detailed account is deemed entirely unnecessary. In compliance with the expressed wish of Dr. R. P. Thomas, our worthy Professor of *Materia Medica*, when lecturing on Jalap, that some member of the class would examine and determine unequivocally "whether the aqueous extract of jalap, deprived of the resins, was possessed of any purgative properties," I have made the following experiments.

A summary of the experiments of Gerber, Henry and other chemists equally distinguished, is here given, that the experiments I have instituted may be more intelligible:

<i>Gerber's Analysis.</i>		<i>Henry's Analysis.</i>	
Hard resin	7.8	Resin	12
Soft resin	3.2	Extractive	15
Slightly acrid extractive	17.9	Starch	19
Gummy extractive	14.4	Woody fibre	54
Coloring matter	8.2		
Uncryst. sugar	1.9	Jalap	100
Gum with some salts	15.6		
Bassorin, starch	9.2		
Vegetable albumen	4.7		
Water	4.		
		<i>Analysis of the Resins.</i>	
Salts of lime		Hard resin	70
Magnesia and potassa	13.1	Soft resin	30
Jalap	100.0	Jalap	100

A. Two thousand grains of jalap, in fine powder, mixed with three times its bulk of well-washed sand, were treated with water by displacement until thoroughly exhausted, the fluid passing colorless and almost tasteless. The percolate was then carefully evaporated, over a water bath, to the consistence of a semi-solid extract. This extract was then subjected to the action of alcohol and ether to remove the resins; by first throwing the aqueous extract into twelve fluid ounces of alcohol, 95 per cent., agitating and decanting the solution, which was of a light brown color, possessing a strong jalap odor. It was then treated with another portion of alcohol (f. ʒxij.) of the same strength and heated to the boiling point. The residue was then treated with successive portions of ether, as long as it became colored. The ethereal washings were of a light yellow color, having but little odor and taste.

The alcoholic liquids were now mixed and yielded, on evaporation, five drachms of the impure resin.

B. Two thousand grains of the powdered root were moistened with a small quantity of alcohol, 85 per cent., packed firmly into a glass funnel and covered with a disc of filtering paper. Alcohol, of the same strength, was then poured on from time to time, until the percolate measured three pints, having passed very slowly, when the powder seemed to be thoroughly exhausted. The first ten fluid ounces of the tincture were kept separate. This was a syrupy liquid of a dark brown hue. The remaining tincture was then evaporated to one pint and mixed with the first liquid, when the whole was carefully evaporated by means of a water-bath to the proper consistence. The result was four hundred and twenty grains, a yield of twenty-one per cent. of resin of the Edinburgh Pharmacopœia.

C. Two hundred grains of the resin of jalap placed in a flask were treated successively with ether and boiling ether. The solutions were then mixed; the ethereal tincture had a strong jalapy odor and taste, and was of a light reddish brown color, and yielded, on evaporation, sixty-five grains of the ethereal or soft resin. The residue in the flask, which was supposed to be the hard resin in combination with coloring matter, was then treated with several portions of alcohol, 95 per cent., both cold and hot, but was found to be only sparingly soluble in that

menstruum, entirely soluble in diluted alcohol and boiling water. The result of this experiment seeming somewhat singular, as a test for its accuracy the following experiment was made :

One hundred grains of the medicinal resin, carefully prepared on a previous occasion, were treated in the same manner, and the result corresponded precisely with that of the above experiment.

The aqueous or gummy extract, prepared by the process given in experiment A, was therapeutically tested. Having been taken in doses ranging from ten to twenty grains, a final trial was given it. One drachm divided into two doses was administered, one at night just before retiring, the other the next morning before breakfast, without producing the least effect. It therefore may be, with safety, considered entirely inert.

The experiments made with the soft resin—the resin soluble in ether—lead me to differ from the opinion entertained by most writers on *Materia Medica*, viz., “that this resin possesses little, if any, activity.” Three grains of this soft resin were taken by a person suffering from constipation ; it acted as a hydragogue cathartic, three hours after it had been administered, producing but little uneasiness, and continuing in its operation for more than twenty-four hours. That there might be no doubt as to the correctness of this experiment, it was tried by another person in the same dose. Three grains in form of a pill were administered at bed-time, and produced, the following day, a powerful cathartic effect, accompanied with severe griping.

These experiments, which were made with great care, (and in every case where there was the least room for doubt, a second experiment was instituted,) determine conclusively that the gummy or aqueous extract is entirely inert, and that the activity of jalap as a purgative is not due to the hard resin (that which is insoluble in ether) exclusively, but also to the ethereal or soft resin, which is fully equal to, if not possessed of, stronger purgative properties.

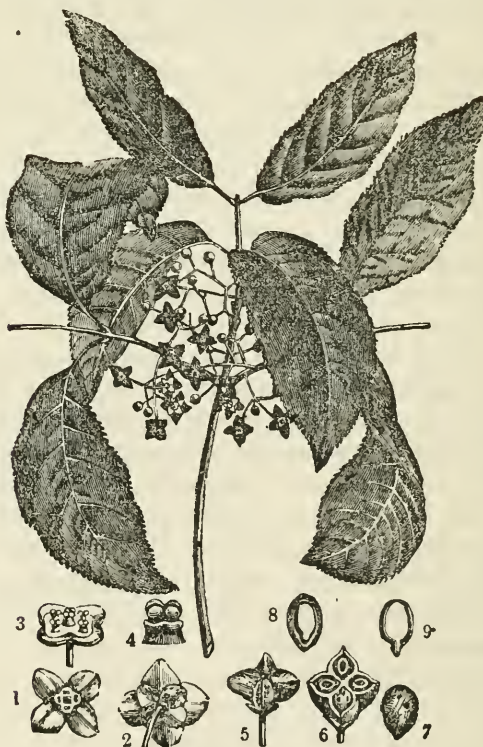
Philadelphia, Nov. 24th, 1860.

ON THE BARK OF EUONYMUS ATROPURPUREUS.

By WILLIAM P. CLOTHIER.

(Extracted from an Inaugural Essay.)

The plant producing this bark is a small tree or shrub, tall and upright, leaves petioled, oval, oblong, pointed; the flowers commonly in fours; sepals 4 or 5, united at the base, forming a short and flat calyx; petals 4-5 rounding, spreading; stamens very short, inserted on the upper face of a broad and flat, 4 to 5-angled disk, which coheres with the calyx and is stretched over the ovary. Style short or none. Pods 3 to 5-lobed, 3 to 5-valved, smooth. Seeds one to two in each cell, enclosed in a red aril. The leaves are serrate, and the flowers, which are in loose axillary cymes, are of a dark purple color.



At the close of Autumn this tree is conspicuous and ornamental from its clusters of crimson fruit. Though frequently

met with in gardens, it is more abundant as an indigenous product in the Western States. Its local names are *wahoo*, *spindle tree*, and *burning bush*.

The bark was introduced to notice by the late George W. Carpenter, of this city, as a remedy for dropsy, for which purpose it had been employed in the West. The infusion, made an ounce to the pint, is used in wineglassful doses for dropsy. A fluid extract has also acquired some celebrity, and the "Eclectic" practitioners employ a resinoid product of the bark under the name of "Euonymine" as a tonic, cathartic and alterative. The taste of the bark is intensely bitter and persistent. The bark was subjected to a partial qualitative examination with the following results:—

The cold infusion contains much *gummy matter*, but is not coagulated by heat, nor is it affected by the liquid tests for albumen. *Starch*, however, is present; but neither sesquichloride of iron, gelatin, or a solution of quinia give any indication of tannic or gallic acids.

The decoction, when subjected to Trommer's test for grape sugar afforded evidence of the presence of that substance as a constituent of the bark.

The bark, after exhaustion by diluted alcohol, yielded *pectin* or *pectic acid* to an alkaline solution of carbonate of soda, from which, by the addition of hydrochloric acid it was precipitated.

The bark in powder was treated by percolation with alcohol, sp. gr., .835, the tincture evaporated to a syrupy consistence, and thrown into water. An oleo-resinous matter precipitated consisting of resin, fixed oil and fatty matter, and which possessed a dark yellow color and bitter taste. This is the so-called "Euonymine" of the Eclectics. Six grains were taken at a dose, and in a few hours brisk purgation was produced, without any attendant griping effect; its action resembles that of castor oil.

When the tincture of the bark, made with diluted alcohol, is agitated with chloroform, and the chloroformic liquid separated and evaporated spontaneously, a small product of yellow acicular crystals is obtained. These are bitter, soluble in chloroform and boiling alcohol, which deposits them on cooling. The solution of this substance is neutral to test paper. It was ob-

tained in so small a quantity that its other properties were not investigated.

When the powdered bark is treated with ether, the tincture yields by evaporation a resinous matter, which, when taken internally, had no perceptible action analogous to the alcoholic resin.

The bark, when distilled with water, yields a transparent distillate without a trace of volatile oil.

The aqueous extract of wahoo bark is black, intensely bitter and contains much extractive matter. Diluted alcohol is the best menstruum for exhausting this bark in preparing from it a fluid extract. This preparation should be of the strength of an ounce to the fluid ounce, and may be given as a purgative in tablespoonful doses, and as a tonic in teaspoonful doses.

ON ASCLEPIAS TUBEROSA (PLEURISY ROOT.)

BY ELAM RHODES.

(Extracted from an Inaugural Essay.)

The Butterfly weed, or pleurisy root as it is frequently called, is a perennial plant indigenous to the United States, but more abundant south than north. The root is an officinal of the U. S. Pharmacopœia. It is a large, irregularly tuberous, often branching, somewhat fleshy root, externally brown, internally white and striated, and in the recent state of a subacid, nauseous taste. When dried, its taste is bitter but not unpleasant.

It was subjected to a chemical examination; the infusion, obtained by percolation was blackened by a sesquisalt of iron, and was precipitated by solution of morphia and by solution of gelatin; and when exhausted by the latter, the filtered solution yielded a black coloration with sesquichloride of iron, which was discharged by heat—indicating the presence of *tannic* and *gallic* acids. The cold infusion was precipitated by infusion of galls and by corrosive sublimate, and when boiled was rendered cloudy, indicative of *albumen*.

The percolate obtained from the root by an alkaline solution afforded a gelatinous precipitate of pectin when saturated with dilute sulphuric acid.

A decoction, when allowed to cool, gave evidence of being strongly charged with *starch*, when tested by iodine; and the presence of *gum* was determined by appropriate tests.

The ligneous portion of the root, when freed from other matters by solvents, amounted to from 30 to 35 per cent. of its weight.

The ethereal extract is a brownish yellow mixture of resin, fixed oil and coloring matter. The root after exhaustion by ether affords to alcohol a resin not soluble in ether.

When the syrupy alcoholic extract of the root is thrown into water and allowed to stand, an oleaginous yellow colored matter rises to the surface; no precipitate of consequence occurs. By evaporation an extract is obtained, which forms a cloudy homogeneous mixture with water possessed the taste of the root, and appeared to retain fixed oil and resin in intimate mixture in suspension.

Repeated distillation of the root afforded no volatile oil, but the distilled water was odorous of the root, and the receiver was contaminated with a solid substance. This, when removed by ether, and the latter evaporated, appeared to be a volatile, fatty, odorous substance.

The drug appears to contain a peculiar principle precipitable by tannic acid. The concentrated cold infusion was treated with tannic acid till reaction ceased, and the precipitate was collected, washed, pressed, and mixed with an excess of litharge and dried. This, when exhausted with hot alcohol, decolorized and evaporated, yielded a small quantity of a yellowish white powder, possessing the peculiar taste of the root, soluble in ether, much less soluble in water, and precipitable by tannic acid.

The root also contains much extractive matter. The ashes of the root afforded potassa, soda, sulphuric acid, lime, oxide of iron, magnesia and oxide of manganese.

Medical Properties.—The pleurisy root is stated to be diaphoretic and expectorant, without being stimulant. It has been considerably employed in medicine as a remedy in pleurisy, pneumonia, catarrh, and other pectoral affections, and its popular name has arisen from this use. It has also been employed in febrile diseases, acute and chronic rheumatism, diarrhoea and dysentery. It appears in large doses to be mildly cathartic.

Being desirous of having its merit tested therapeutically, a

fluid extract was prepared by the following formula, similar to one of those given at page 532, vol. xxxi. of the Amer. Journal of Pharmacy.

Take of Pleurisy root, in Powder No. 50, sixteen ounces ;

Alcohol, three pints ;

Water, a pint and a half.

Mix the alcohol and water, and having moistened the powder with four fluid ounces of it, pack it in a glass funnel prepared for percolation, and pour on the remainder of the menstruum, reserving the first twelve fluid ounces. After the liquor ceases to pass, evaporate the remainder in a water bath to four fluid ounces and mix it with the reserved tincture, and filter after standing 24 hours.

Prepared in this way the fluid extract is an elegant preparation fairly representing the root. The author submitted this fluid extract to several of his medical friends, and among others to Dr. H. D. W. Pawling, of Norristown, whose report is inserted in full.

Report of Dr. Pawling.

“ Case 1st. Mrs. Mary Anderson, aged fifty-four, (habit plethoric, mode of living regular), was attacked with inflammatory rheumatism, on the 29th of January last. Previous to my visit she had purged herself freely with senna and salts. Her ankles, knees and wrists were much swollen, and exceedingly painful; her pulse full and bounding. I directed her to repeat the purge, and then to use the fluid extract of *Asclepias tuberosa* in teaspoonful doses, every two hours, until it reduced the action of the heart and acted well on the skin. Fomentations of cloths wrung out in hot water were applied to the swollen joints. Using this remedy for twenty hours. I found on my second visit it had not acted as I wished, and as the method was somewhat experimental (though a tea made from the weed is a common remedy with the country people for the purpose of sweating), I was inclined to continue in the same plan, increasing the dose. I therefore ordered two teaspoonsful to be used every second hour, mixed in a wine-glassful of hot water, sweetened. After using it in this dose for a few hours, the pulse was reduced in its action, free perspiration was brought about, and her whole condition rendered more comfortable. The dose was then diminished one half again, and the system kept under the action of the remedy, by a repetition every fourth hour, until complete convalescence was established.

“ The action of the remedy in this case gave me great satisfaction. No opiates or blister were resorted to.

“Case 2d. Robert Brown, aged 28, stature small, habit plethoric, miner by occupation, was attacked January 30th, with lumbago—rheumatism of the loins. On my first visit, I found him unable to move without exceeding pain,—pulse full and bounding. Bled to the extent of 20 oz., and, owing to his inability to assist himself, omitted a purge. Commenced the use of the *Asclepias tuberosa* in two teaspoonsful doses every two hours, mixed in a wineglassful of hot water; together with mustard poultices to the back. On my next visit, after an absence of twenty-four hours, I found his condition more comfortable; better able to move. Cupped his back. Gave a purge of senna and salts; continued the use of the *Asclepias* in one teaspoonful every second hour; no opiates. On my next visit the pulse was natural; pain nearly gone. Directed the *Asclepias* to be given one teaspoonful every fourth hour. His recovery was rapid. No unpleasant symptoms from the use of the remedy. In this case the perspiration was profuse, and the skin continued to act as long as the remedy was in use.

“Case 3d. Mr. John Morgan, aged fifty; farmer by occupation, habits good, temperament sanguine; was attacked on the 31st of January with violent pain in his head, accompanied with rigors and vomiting. The pain in his head was intense. Visited him at midnight; his pulse was strong and full; no general fever. Bled to the extent of producing syncope. Ordered calomel grs. xv., jalap grs. x., gamboge gr. j., to be followed by senna and salts in four hours. Visited again in the morning; medicine had operated and was still acting; head somewhat relieved, but still acutely painful; pulse not so active; eyes bloodshot. Ordered cups to nape of neck, blisters to extremities, and to take the *Asclepias*, in teaspoonful doses, every hour for six hours. Ice applied to head. Visited again that day; no relief; blisters not yet filled. Ice continued to head; remedy continued. On my next, found some improvement; skin moist: pulse soft; head cooler eyes not so much injected, but some delirium. Reapplied cups; blisters acted well; some nausea, attributed to the *Asclepias*. Discontinued its frequency, and gave two teaspoonsful every third hour. From this time he continued to mend, and had a rapid recovery. I think the *Asclepias* has a decided effect in reducing the circulation, and producing perspiration.

“Case 4th. Mr. Dorr, aged 45, sober, married, temperament sanguine, was attacked with pneumonia on the 1st day of February last. On my visit to him I found him breathing with difficulty, crying out with each effort to inflate the lungs; pulse quick and corded; bloody expectoration: cough incessant. Bled freely to the amount of 24 oz.; cupped between the shoulders. Bowels have been freely moved with castor oil; blister applied to the right lung. Ordered the *Asclepias* in teaspoonful doses, with the addition of $\frac{1}{4}$ gr. tartarized antimony, and $\frac{1}{6}$ gr. acetate morphia, every third hour. 2d of February: condition not much improved; reapplied

cups; blister drew well; applied savine ointment. Expectorates still bloody, gummy mucous; pain not so great; cannot lie down. Increased the Asclepias to two teaspoonsful, other additions the same, time the same. 3d. Condition improving, remedies continued. 4th. Condition still improving; pulse soft; skin moist, tongue clean; cough soft; no bloody matter. 5th. Bowels constipated; ordered castor oil ʒij. ; continued Asclepias, omitting tartaremetic; addition of morphia still continued. 6th. Still improving, breathes freely expectorates freely. Discontinued morphia addition, diminishing Asclepias to teaspoonful, time the same. So he continued to improve until convalescence was finally established.

Remarks.—As far as my experience permits a judgment on this preparation of *Asclepias tuberosa*, furnished by you for my use, in these experiments, and some others in which I have used it, I am satisfied it has a powerful effect in reducing the circulation, and acting promptly on the skin; but the dose required should be large, and frequently repeated until the skin begins to act. In active inflammatory cases, the two teaspoonsful of your preparation, repeated at intervals of two hours, in every case in which I have used it, acted promptly, reducing the volume as well as the activity of the pulse, and invariably producing profuse copious perspiration, which can be regulated afterwards by diminishing the dose, and adding to the time.”

ON THE CHEMICAL CONSTITUENTS OF COCA LEAVES.

By J^{NO}. M. MAISCH.

These interesting leaves are beginning to attract considerable attention both in Europe and America; the accounts of learned travellers and of physicians, who have lived for a number of years in the districts where *Erythroxylon coca* is cultivated, and where the leaves are employed for the preservation of the bodily strength amid continued hardships, all these accounts agreeing in the main points, it was natural to expect that the reflecting physician would desire to investigate their adaptation for the cure of disease. The greatest drawback to such investigations is undoubtedly the limited supply of the leaves, but I believe a sufficient quantity might be found in the United States for experiments in our hospitals.

Several papers have within the last year found their way into the scientific journals of America; among these an analysis of the leaves performed by Dr. A. Niemann on page 122, of the present volume of this journal. The principal object of his in-

vestigations was to search for an alkaloid, which he separated in a pure state and analyzed. The wax and tannin were separated incidentally in the process for liberating the alkaloid, so that we are still in the dark about its other constituents.

A few months ago, I obtained through the kindness of Professor Procter, a few ounces of coca leaves for the purpose of analyzing them. I should have desired very much to pay attention likewise to those constituents which are probably of less importance in regard to their medical properties, but at all events I had to follow the course marked out by Dr. Niemann, so as not to lose the opportunity of obtaining a little of the new alkaloid, and study the other substances isolated by him.

Accordingly, 1500 grains of the coarsely powdered leaves were exhausted in a funnel-displacer by alcohol mixed with a little sulphuric acid. The dark colored brown-green tincture was agitated with an excess of milk of lime, which assumed a brownish-green color; the filtrate therefrom, together with the washings with cold alcohol, was carefully neutralized with sulphuric acid, filtered from the greenish sulphate of lime and distilled. The aqueous residue separated but little resinous matter, the filtrate therefrom was precipitated by carbonate of soda and the alkaloid gained in an impure state by shaking the mixture with ether and evaporating the light straw-colored ethereal solution. The yield was 4 grains, and the alkaloid showed the behaviour described on pages 123 and 124.

On adding the milk of lime to the acid tincture, the peculiar tea-like odor of the leaves was strongly developed; but on the addition of the carbonate of soda another heavy and narcotic odor is observed; this is described by Maclagan and Niemann as reminding of nicotina. I observed this slight resemblance, but still the odor is very different.

I likewise found Dr. Niemann's statements correct regarding the vegetable wax and the tannin; though, owing to the small quantity operated on, I was unable to obtain the former in a snow-white condition. The second acid, which Niemann considers as tannin modified by nitric acid, I obtained also in solution contaminated with some of the latter acid.

The alkaloids of coffee and cacao, which, though in a less degree, possess properties similar to those of coca, contain

more nitrogen than any other alkaloid known. The small percentage of nitrogen ascertained in cocaina by Dr. Niemann, suggested the idea that it might probably be a product of decomposition, and that the odor developed by carbonate of soda, might perhaps be a nitrogenous body or another alkaloid. To ascertain this, and to find out whether one or two acids were contained in the tincture, the above process was repeated with the balance of leaves, weighing less than an ounce. The liquid, together with the precipitate occasioned by carbonate of soda, was introduced into a retort, the neck of which was connected with a bent glass tube, dipping into a little dilute muriatic acid. When heated over the spirit lamp, the concussions were so violent that it was deemed advisable to place the retort in a sand bath, so as to supply from the sides sufficient heat to distil the volatile substances, until a syrupy liquid remained behind, from which the alkaloid was separated by ether.

The muriatic acid, which was perfectly clear and colorless, now had an odor somewhat different from the original odor of the alkaline liquid, but it resembled that of the residue in the retort. The acid solution was rendered alkaline by carbonate of soda and agitated with ether, which took up the odorous principle leaving it behind on spontaneous evaporation as a soft resin-like coating. The odor of this mass is heavy, narcotic, the taste similar, somewhat acrid; the behaviour to test paper, neutral, but exposed to the damp atmosphere of a rainy day, it had almost completely lost its odor and acquired an acid reaction and taste, and was now easily soluble in water and alcohol; the solubility of the odorous mass in these menstrua had not been tried. I omitted to mention that the hydrochloric acid solution was tested with the usual reagents for alkaloids: phosphomolybdic acid, and the chlorides of gold, mercury and platinum, without being disturbed by either.

This odorous principle which I regard as a product of decomposition of some constituent, is therefore volatile with the vapors of water in a slight degree, but very changeable at least in a moist atmosphere. It is likely to be of great importance, as it is stated by several observers that an infusion of the leaves has different properties from the same leaves chewed with an alkali. Whether or not it is nitrogenous, must at present be left undecided.

The solution from which the alkaloid had been removed by ether, was digested with precipitated carbonate of baryta, which removed all the sulphuric acid, and acquired a pale greyish white color. The filtrate was neutralized with acetic acid, and after the expulsion of the carbonic acid, rendered very slightly alkaline by a few drops of liquor ammoniæ. An aqueous solution of neutral acetate of lead was now carefully dropped in, as long as a dirty greenish brown precipitate was produced, which is voluminous, but settles in a few minutes and may be readily filtered and washed. On the further addition of neutral acetate of lead a precipitate is separated which is at first yellowish white, but settles readily to a greyish yellow.

The liquid filtered from this last precipitate, is not disturbed on the further addition of sugar of lead, but yields with basic acetate of lead a nearly white voluminous precipitate which is insoluble in water, but readily soluble in acids. Corrosive sublimate and deutonitrate of mercury do not disturb it; protonitrate of mercury yields a whitish precipitate, insoluble in water, almost entirely soluble in nitric acid; the white precipitate by nitrate of silver is scarcely taken up by nitric acid, but readily by ammonia. The liquid contains a small quantity of muriatic acid, but besides it an organic acid which imparts to it a brownish yellow color. This color becomes deeper on exposure to the air, and after 24 hours standing, neutral acetate of lead produces a precipitate which resembles in color the yellowish white precipitate spoken of before. The filtrate was now of a pale yellow color and was not further disturbed by acetate or subacetate of lead after exposure to the air.

The first of the above-mentioned lead compounds dried to a dirty yellowish brown powder; the second to a powder of a similar, but lighter color.

The alkaloid which had been separated by ether from the alkaline solution left behind in the retort, was obtained as a transparent mass of the consistence of balsam tolu, a somewhat lighter color, and of a heavy narcotic odor. All attempts to crystallize it failed, but it had still an alkaline reaction to test paper, was insoluble in water, but soluble in acids, which it completely neutralized. The solution in hydrochloric acid yielded with alkalis and their carbonates a white precipitate

soluble in ammonia, with phosphomolybdic acid a voluminous yellowish white, with bichloride of platinum a yellowish grey, with terchloride of gold a bright yellow, with bichloride of mercury a voluminous white, afterwards flocculent, with iodine an orange brown precipitate; no coloration was produced by this alkaloid with oxidizing agents.

It will be seen from these experiments that this uncrystallizable alkaloid had very nearly the same behaviour as pure cocaina, the principal difference being the reaction with iodine, which with the former is of a somewhat lighter color with a slight yellow tinge. Heat, it appears, therefore, renders it amorphous; what part the water and carbonate of soda take in this change must be determined by experiments with the pure alkaloid. But it is very likely that the yellowish brown matter, which Dr. Niemann found so difficult to separate from cocaina, is this same alkaloid in an amorphous state.

My experiments likewise render it more than probable, that the substance named cocatannic acid by Dr. Niemann, is a product of oxidation, the original compound of which yields with acetate of lead from a slightly ammoniacal solution no precipitate, but after previous oxidation by the atmosphere, precipitates it, and the precipitate has, according to the length of exposure, a color varying from white to yellow and brown. As it is so readily affected by the atmospheric oxygen, great care is necessary in its separation from the other constituents.

Philadelphia, Sept. 1861.

GLEANINGS—MISCELLANEOUS.

Tubular Condenser.—Mr. Thomas Keates, of London, exhibited, at the April meeting of the Pharmaceutical Society, a tabular condenser, possessed of great effectiveness. It consists of a tinned copper cylinder, three feet long and eight inches in diameter, divided into three apartments by two diaphragms placed about four inches from either end. The upper and lower chambers are connected by about twelve tinned copper tubes half an inch in diameter, smoothly soldered in above and dipping half an inch into the lower chamber. The middle chamber

has two openings, one below for the ingress of the refrigerating water, and one above for the escape of the heated water. The upper space has two openings, one central and vertical and one lateral and inclined, for the ingress of the vapor, so as to accommodate a vertical or inclined tube connecting it with the still or boiler. The lower apartment has one lateral opening for the escape of the condensed vapor.

It will be perceived that this instrument is really a compound Liebig's condenser, and, if a constant and sufficient current of cool water circulates through it, that its condensing power is very effective, and readily serves a fifteen gallon still. By making the lower chamber separate, so as to slip over the central one at the lower diaphragm, it may be removed at will, and the tubes cleaned with a swab, after operations with odorous liquids.—(Pharm. Journ.)

The Artificial Production of Ice.—M. Carré has recently communicated to the French Academy a means of producing low temperatures upon a large scale, which are simple and not very expensive, depending on the rapid evaporation of liquified ammoniacal gas. The apparatus consists of two ordinary cylindrical boilers, one having four times the capacity of the other, the larger one being three-fourths filled with the strongest solution of ammonia. The two boilers are connected by a tube provided with a stopcock. Before closing the apparatus the whole of the air is driven out. Heat is then applied to the larger vessel until the solution acquires the temperature of 130° to 140° , the cock being open. Under these circumstances the ammoniacal gas, disengaged from the solution, having no means of escape, condenses in the small boiler in a liquid form under the great pressure. When it ceases to increase, the cock is closed and the large boiler cooled. The apparatus then contains liquid ammonia in one vessel and cold water with a vacuum above in the other. The small boiler is surrounded with cold water and the tap opened, when the rapid evaporation of the condensed gas abstracts so much heat from the water through the boiler as to freeze the water surrounding it. The ice thus formed is then removed and the operation repeated. It is necessary that the apparatus be absolutely tight and capable

of bearing a pressure of at least ten atmospheres, (150 lbs. to the square inch.) The temperature of the ammonia sinks to 40 degrees below zero.—(Pharm. Journ., Aug. 1861.)

Native Nitrate of Soda.—One of the British Consuls in Brazil reports that, in the neighborhood of the river San Francisco, in Bahia, Brazil, at a place called “Salitre,” large deposits of nitrate of soda exist. In the words of a distinguished Brazillian, it is found through a valley of from 16 to 20 leagues in extent; in some places on the surface, at others a few feet under, in masses, and is sufficiently abundant to yield a supply for exportation for years to come. On the opposite side of the San Francisco river, near the town of Pilao Arcado, other equally large deposits exist. The projected Bahia railroad to the town of Joazeiro must pass through the first named district at a distance from the coast of 240 miles.—(Chem. News, Aug. 17, p. 98.)

Paraffin as a Lubricant for Alkaline Solution Bottles.—The constant difficulty arising from the fixing of the stoppers of caustic potash solution bottles may be avoided by dipping the stoppers in melted paraffin, upon which substance the alkali has no action, and which acts as a lubricant.—(Chem. News and Polyt. Notizblatt.)

Salisburia adiantifolia, or Ginkgo Tree.—Daniel Hanbury, in his elaborate notes on Chinese Materia Medica, (Pharm. Jour., May, 1861,) says that the fruit of this tree is called *Pih-kwo* and *Yin-hang* (silver almond) in China. “These are nut-like, oval, pointed seeds from half an inch to an inch long, keeled lengthwise on two sides, and having a smooth, fragile, bony, pale brown, outer shell or testa. The nucleus of the seed consists of amylaceous albumen enclosing a pair of long narrow cotyledons, the whole enveloped in a delicate reddish brown membrane.

“*Salisburia adiantifolia* is commonly cultivated both in China and Japan, where it attains a large size. The male plant was introduced about a century and a half ago, the female much more recently. The tree is not uncommon in gardens; and in the warmer parts of the Continent it ripens its handsome plum-

like yellow fruit perfectly. Kæmpfer says the seeds are eaten to promote digestion. The pulp, which has a penetrating, offensive smell of butyric acid, has been chemically examined by Dr. Schwartzbach, who has extracted from it by means of ether a peculiar crystallizable fatty acid, which has been named *Gingkoic acid*, and which has the composition $C_{48}H_{47}O_3 + HO$. Gingkoic acid forms tufts of acicular crystals, which have not been obtained colorless, but are of a brownish yellow; it is easily soluble in alcohol or ether, and exhibits in either case a strong acid reaction. It fuses at 95° F. and congeals at 50° . Heated with solution of potassa it forms a soap-like compound. The other constituents of the pulp are pectin, gum, glucose, citric acid and chlorophylle." This tree was introduced into the United States about 1780, but so far as we know only the male tree was found here.

Cod-liver Pills.—Under this name a complex compound purporting to be an extract embracing the active principles of cod-liver oil is sold. The following analysis of this substance, made by Dr. Garreau, of Lille, for the Academy of Medicine, is found in the Chemist and Druggist, June 15, 1861, viz. :—

Ichthy-glycine—hepatic, glocozen and azotized products,.....	50.000
Acetic, lactic and butyric acids,.....	6.000
Phosphoric acid,.....	2.090
Sulphuric acid,.....	0.200
Chlorine,.....	1.525
Iodine,.....	0.054
Bromine.....	trace,
Soda,.....	1.170
Potash,.....	0.211
Magnesia,.....	0.366
Lime,.....	0.510
Propylamin,.....	2.545
Ammonia,.....	2.862
Extractive matter undetermined, gaduin, &c.,.....	10.620
Water,.....	21.847
	<hr/>
	100.000

This extract appears to be made by M. Despinoy, of Lille, in France, and professes to possess more curative power than cod-

liver oil. As a difference of opinion exists in regard to cod-liver oil, as to whether it is the pure oil or the associated ingredients that are curative, it should not be hastily assumed that this extract is medicinally valuable.

Ailanthus glandulosa.—Alonzo Lilly, Jr., in a thesis presented to the Maryland College of Pharmacy last spring, states the following to be the constituents of the bark and leaves of this tree:—

Bark.—Starch, tannin, albumen, gum, sugar, oleoresin and a trace of volatile oil, potassa, phosphoric acid, sulphuric acid, iron, lime and magnesia.

Leaves.—The same organic ingredients with the addition of pectin and chlorophylle, and minus lime and phosphoric acid.—(Journ. and Trans. Md. Coll. Ph.)

Soluble Salts of Copper, Lead and Tin in newly distilled Spirits.—Dr. A. A. Hayes, of Boston, expresses his conviction that strychnia and analogous bodies are not used as agents to adulterate spirits, as has been alleged, both from his chemical researches and the testimony of parties most likely to know if such was practised. But whilst dismissing this bugbear, Dr. Hayes points out a source of danger not thought of, derived from the organic acids of the impure spirit, and the metals of the still. “The quantity of copper contained in the bulk usually taken at a draught is sufficient to produce the minor effects of poisoning. The cumulative character of these poisons may even lead to fatal consequences. Dr. Hayes believes that all new spirit is liable to these contaminations, but that all of them lose it by age, the metallic oxides being precipitated in some form in the vessels in which the liquors are kept. Hence, in the process called “ripening,” at least one cause of the changed character of the liquor may be due to this cause. The particular acids which occasion the difficulty are chiefly acetic and butyric, but probably valerianic and succinic acids may be concerned, as those acids are more or less present in the fermenting vats.—(Amer. Journ. Science and Arts, July, 1861.)

The Cork Trade of Bordeaux.—There are at present in Bordeaux 25 cork factories, employing 75 workmen, using an-

nually 3,396,846 lbs. of cork bark, and producing about 10,000,000 corks. 90,000,000 ready made corks are obtained from the neighboring places of Nesac, Bayonne, and Provence. The cork trade of Bordeaux, therefore, may be estimated at 100,000,000 corks annually, worth about £156,338. Two-fifths of this quantity are exported to the French colonies, the United States, Chili, India, &c., and three-fifths are used in Bordeaux, at the average price of £1 4s. per thousand.—(Newspaper.)

Grand Surgical Prize of the French Academy.—This is for the *preservation of limbs by preserving the periosteum*. The prize is 20,000 francs to be awarded, if occasion offers, in 1866. The following extract explains the object of the Academy:—

Numerous facts have proved that the periosteum has the power of producing bone. Recently some remarkable facts in human surgery have shown that very extended portions of bone have been reproduced by the periosteum which remained. The time appears to have arrived to call the attention of surgeons to this great and novel study, which is interesting at once to science and humanity. The Academy made the prize 10,000 francs, to which the Emperor added as much more.—(Silliman's Journal, July, 1861, page 95-99.)

ON THE BARK OF CEDRELA FEBRIFUGA, BLUME.

BY DR. F. A. FLÜCKIGER.

The author gives the following description of this bark derived from a tree, belonging to *Hesperideæ-Cedreleæ*:

Pieces $\frac{1}{2}$ metre in length, .05 to .06 m. in width and 4 to 5 millim. in thickness, either freed from or covered with the outer bark, the latter resembling that of pine. The surface, where the outer bark is wanting, is of a rusty color, partly covered with secondary cork, and marked with impressions like the so-called *conchas* of cinchona barks.

Inner surface light brown; smooth, fibrous; fracture tough, long fibrous. Without a magnifier, several layers of periderma are seen, covering a very dense red brown parenchyma, intersected by medullary rays. Under the microscope, the periderma

appears to be composed of several alternating layers of cork and parenchyma cells, and is therefore a true rhytidoma. The last mentioned cells are filled with brown coloring matter; they are more roundish in the secondary parenchyma, thin-walled, intermixed with many small groups of bast cells.

The innermost corky layer is followed by a few thick-walled porous cells, filled with a brown resin or coloring matter, and by the inner parenchyma; consisting of uniform somewhat tangentially elongated cells, which are likewise filled with brown coloring matter. The outer layer of this portion contains but few bast cells; in the inner layer, however, rows of such cells alternate with parenchymatous strata. These several layers are separated by dark brown lines, probably intercellular matter, which are produced by the one-sided thickening of the walls of a whole row of parenchyma cells. The contexture is again radially divided by numerous light large-celled medullary rays, so that the whole inner bark appears to be divided into rectangular fields, which are tangentially elongated, and may be recognized by the magnifying glass.

The bark is free from starch, but it is interspersed with numerous rosettes of crystals of oxalate of lime, precisely like the roots of *rheum*, *viola*, *fragaria*, *vincetoxicum*, *cortex canellæ albæ* and many other drugs.

The longitudinal tangential section shows the very long bast cells, the apparently elongated parenchyma cells, and the crystals in rows in the interstices.

The whole anatomical structure of *Cedrela* bark reminds of *cinchona*, and approaches *Loxa* bark probably nearer than any other, though they may be readily distinguished by external signs. The difference in their anatomy is as follows:

Cedrela bark wants a resin ring, observable with the naked eye, though resin cells are present; starch is likewise wanting. Instead of the crystal cells of the *cinchona* barks, containing single crystals, *Cedrela* bark has them always in cavities. The bast cells resemble those of the *cinchonas* very much, but are invariably much thinner, longer, less plainly arranged in layers and rarely with porous canals. The cross-section shows the bast cells roundish, not angular like those of *cinchona*, and either with very little lumen or entirely closed. While their diameter

is 1-50th or to the utmost 1-30th millimetre, the smallest bast cells of *Loxa* bark have 1-20th to 1-12th, other kinds, *Cuscoflava*, for instance, even 1-6th m. m. in diameter. The texture of *Cedrela* is in general smaller-celled and less elongated, as compared with *cinchona*; but the cells of the liber are a good deal longer. Another marked difference is in the arrangement of these cells, which in *Cedrela* are placed in rows by bundles, while in *cinchona* they are irregularly interspersed.—(Schweiz. Zeitsch. vi. 125—127.)

J. M. M.

ON THE BARK OF MILLINGTONIA HORTENSIS, LIN. FIL.,
BIGNONIACEÆ.

By DR. H. HOLLANDT.

The bark which was obtained from Dr. A. Flückiger, and which is highly esteemed in Java as a febrifuge, consists of quills, $1\frac{1}{2}$ feet in length and $1\frac{1}{2}$ lines thick. The external corky portion is $1\frac{1}{2}$ times thicker, and may be readily separated in small pieces from the internal portion. The surface is of a brownish yellow color, and longitudinally irregularly fissured. The fissures frequently show on their margin different layers, indicated by darker and lighter stripes. Transverse fissures are not frequent and always short. The last is tough, fibrous, and may be separated lengthwise in lamellæ. The inner surface is smooth and of a lighter or darker cinnamon color. The parenchyma of the primary bark adheres closely to the bast as a thin brown layer of a resinous lustre, which may be readily removed from the corky portion.

The taste is rather insipid, mucilaginous, not bitter. The bark is inodorous, but the reddish-brown powder has in large quantities a somewhat musty odor, reminding faintly of *cinchona*.

Under the microscope the corky layer shows long rows of radial cells, with wavy walls, to which are joined the somewhat compressed and tabular cells of the external parenchyma of the primary bark, exhibiting upon a tangential section, hexagonal tables, with moderately thick walls and superficial dots, the angle of the hexagon never, but always one of its sides lying upwards and downwards. The middle parenchyma or collen-

chyma is irregularly developed, and consists of three or four cells, varying between the hexagonal tabular and rectangular prismatic form, and with the walls thicker towards the corners. The inner parenchyma is composed of tangentially arranged oval cells, frequently separated by a wall of later growth in a radial position, the cells filled with chlorophyll.

The confines of the primary and secondary bark are marked by larger bundles of the bast cells. The whole secondary bark is composed of two kinds of cells, with thick and thin walls, interlined with medullary rays and alternating with each other. The thick-walled cells are prosenchymatous and have but little lumen; they are surrounded by thin-walled, short-celled bast parenchyma, and interspersed with peculiar shaped cells, containing starch. All parts of the bark with the exception of the starch and prosenchymatous cells, contain short prismatic crystals of oxalate of lime.

Chemical analysis of the Bark.—The ethereal extract was treated with water, which dissolved a little of a neutral bitter principle, and a tannic acid, yielding with sesquisalts of iron an olive green color; the portion left undissolved by water consisted chiefly of wax with traces of fixed oil and some olive green coloring matter.

An alcoholic extract was prepared from the bark extracted by ether, and treated with water which dissolved sugar; after destroying it by fermentation, the liquid left on evaporation a brown, shining, brittle mass, which the author considers as chiefly gum or dextrine. The portion not taken up by water was a mixture of wax, resin and coloring matter, probably also traces of fat.

Cold water now dissolved from the bark a minute trace of chlorophyll, some phosphoric acid, a humic acid and dextrine-like gum.

The bark was now boiled with water, and the decoction filtered after cooling. The filtrate contained phosphoric acid, another humic acid, sugar, lime, dextrine-like gum, and some tannin.

The residuary bark yielded to diluted hydrochloric acid, pectine, and oxalate of lime.

The aqueous distillate of the bark was found to be free of any

volatile body. The liquid in the still was precipitated with acetate of lead, and the precipitate treated with acetic acid; the two lead compounds thus obtained contain new humic acids, probably derived from the tannin, and have the composition 4PbO , $\text{C}_{34}\text{H}_{28}\text{O}_{26}$ and 3PbO , $\text{C}_{44}\text{H}_{27}\text{O}_{26}$.

The air dry bark yielded 8.7 pr. ct., the anhydrous bark 10 per cent. ashes which consisted of KO 27.23, NaO .67, NaCl .16, CaO 25.32, MgO 5.62, Al_2O_3 1.20, Fe_2O_3 .95, SO_3 .71, PO_5 3.86, SiO_3 6.31, CO_2 27.97.

It is evident that the composition of this bark does not coincide with its high reputation.—(*Wittstein's V. Schr.* x. 321–342.)

ON THE COLOR OF WATER.

By PROFESSOR WITTSTEIN.

Pure water, according to Bunsen, has a blue color, while additions of other bodies, or the reflection from a colored bottom, cause the color to appear differently. This can be verified by looking at white objects upon a white surface through a column of water, 2 metres in height, or by allowing the sunlight to shine upon these objects after it has passed through such a column of water.—(*Ann. der Chem. und Ph.* lxxii. 44.)

Dr. G. C. Wittstein discusses the causes of the different colors of natural water, and cites analyses performed by himself and others, of the water of several rivers in Bavaria, from which he arrives at the following conclusions :

1. Pure water is not colorless, but blue.
2. Mineral substances dissolved in natural waters, do not alter their color.
3. The various colors of natural waters are due to dissolved organic matter.
4. This organic matter is retained in solution by the aid of alkali, is in mass deep brownish black, in diluted solutions yellowish to brown and belongs to the humic acids.
5. The quantity of the organic matter in solution depends solely on the quantity of the alkali.
6. The less organic matter is dissolved in the water, the less

does its color vary from blue ; with an increase of the organic substance, the color gradually passes into green, yellow and brown, the blue being gradually obscured.

7. Every water meets with a considerable portion of one agent changing the color, namely, humic acid, while the other agent, the alkali, is distributed in very variable degree ; the color of waters poor in free alkali, therefore, approach blue most closely ; an increase of the alkali causes an increase of humic acid, and consequently a change of color into green, yellow and brown.

8. It follows, then, that the nature of the rocks, over which the water flows, furnishes the principal condition for the color of water.

9. Periodical changes of the color of the same water are not caused by a different amount of organic matter, but are dependant on atmospheric conditions, (cloudy sky, &c.)

10. As a general rule, waters are the softer the more they approach the brown, and the harder the nearer they come to the blue color. The cause is not the amount of organic matter, but the amount of alkali contained in solution, on the latter of which, however, depends the proportion of the former.— (*Wittst. V..Schr. x. 342-365.*)

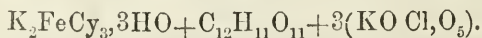
WHITE GUNPOWDER.

Dr. J. J. Pohl has improved on Augendre's white gunpowder (*Sitzunsb. du Akad. der Wissenschaft zu Wien. Bd. xli. s. 634*). He prescribes the following quantities :

Ferrocyanide of potassium	.	.	28 parts.
Cane sugar	.	.	23 "
Chlorate of potash	.	.	49 "

100

which give a well-burning powder, and nearly approaches the proportions



The results of the combustion of this mixture he calculates

to be: $2\text{KCy} + 3\text{KCl} + \text{FeC}_2 + \text{N} + 6\text{CO} + 6\text{CO}_2 + 14\text{HO}$: or 100 parts by weight of the powder is resolved into

47.44 gaseous bodies.

52.56 solid residue.

100.00

The volumes of the gaseous bodies he estimates as follows:

Nitrogen	.	.	.	.	1927.0 C. C.
Carbonic oxide	.	.	.	.	8942.9 "
Carbonic acid	.	.	.	.	8942.9 "
Steam	.	.	.	.	20867.6 "

40680.4 C. C.

Compared with ordinary gunpowder, considered as unity, the results are said to be:

	Ordinary powder.	White powder.
Volume of gas set free	1	2.107
Temperature of flame	1	0.641
Residue	1	0.77

It should seem, then, that the new powder has over the old the advantage of greater power, igniting at a lower temperature, and leaving less residue. The author points out several other advantages: the ease with which the white powder is manufactured, there being no necessity for granulating and glazing, and the less danger of accidents. The higher price of the materials he considers is more than compensated for by the smaller quantity required.

A political and literary contemporary who dabbles a little in science, and who describes the above composition as being *equally white and cleanly with common gunpowder*, dismally prophesies innumerable accidents if white powder should ever come into use, in consequence of the explosive nature of chlorate of potash—a danger to which he, with wonderful prescience, says, the author has never alluded. As it happens, Dr. Pohl is at pains to show that fears like those of our contemporary are groundless. Only, he states, the heaviest stroke of iron upon iron is sufficient to produce an explosion, and that it is impossible to ignite the powder by rubbing it between wood and metal, or between stones.—*London Chem. News*, July 6, 1861.

ON WHITE GUNPOWDER.

By F. HUDSON, Esq.

Having lately prepared different samples of white gunpowder (according to the receipt of Dr. J. J. Pohl, given in the *Chemical News*, July 6) for some military engineering experiments, I have tried the process of separately grinding the materials, viz. chlorate of potash, ferrocyanide of potassium, and cane sugar, and then mixing them; also grinding them together with a little water added, and then dried at a temperature of about 150° . I find that those samples which were prepared moist and then dried are more easily exploded than those prepared by the dry process. In fact, one sample exploded in an open porcelain dish by simple friction with a spatula with which one of my assistants was crushing some of the larger pieces. Through the explosion he was laid up for several weeks and nearly lost his eyesight. No samples prepared dry are as explosive as those prepared moist, the addition of water causing a more perfect mixing of the particles of its chemical constituents than can be effected by the dry grinding process. This accounts for the greater danger attending the use of white gunpowder prepared in the moist way.

A cannon loaded with white gunpowder goes off on the application of a few drops of sulphuric acid (equally as well as with a light applied) to its touch-hole.

This property of the gunpowder may possibly be applied to some advantage in the construction and preparation of bomb shells for long ranges. The shells would not explode (if filled with the white powder and containing a glass vessel with sulphuric acid) until they struck the object. No useless explosion of the shell could take place in the air, as is too often the case with the ordinary fusee shell.

Its expansive or explosive force is also twice that of common gunpowder. In all experiments performed with this white gunpowder, care must be taken not to compress it too violently; otherwise accidents may frequently occur. A blow with a hammer upon stone with some of the powder upon it explodes all samples that I have prepared.—*Chem. News, London, Aug., 1861.*

LIQUID DIFFUSION APPLIED TO ANALYSIS.

By THOMAS GRAHAM, Esq., F. R. S., Master of the Mint.

The unequal diffusibility of different substances in water appears to present means of separation not unlike those long derived from unequal volatility. For as regards diffusion, there exists a "volatile" and also a "fixed" class of substances; and these distinctions appear to correspond with differences in molecular constitution of a fundamental nature. Much value is attached to diffusion, as affording the means of bringing out clearly, and subjecting to numerical expression, the distinctive properties of what appear to be two great divisions of chemical substances.

The first, or *diffusive* class of substances, are marked by their tendency to crystallize, either alone or in combination with water.

When in a state of solution they are held by the solvent with a certain force, so as to affect the volatility of water by their presence. The solution is generally free from viscosity, and is always sapid. Their reactions are energetic and quickly affected. This is the class of *crystalloids*.

The other class, of low diffusibility, may be named *colloids*, as they appear to be typified by animal gelatine. They have little, if any, tendency to crystallize, and they affect a vitreous structure. The planes of the crystal, with its hardness and brittleness, are replaced in the colloid by rounded outlines with more or less softness and toughness of texture. Water of crystallization is represented by water of gelatination. Colloids are held in solution by a feeble power, and have little effect on the volatility of the solvent. They are also precipitated from their solution by the addition of crystalloids. The solution of colloids has always a certain degree of viscosity or gumminess, when concentrated. They appear to be insipid or wholly tasteless, unless when they undergo decomposition upon the palate and give rise to sapid crystalloids. Their solid hydrates are gelatinous bodies. They are united to water with a force of low intensity; and such is the character of the combinations in general between a colloid and a crystalloid, even although the latter may be a powerful reagent in its own class, such as

an acid or an alkali. In their chemical reactions, the crystalloidal appears the energetic form, and the colloidal the inert form of matter. The combining equivalent of the colloid appears always to be high, and it has a heavy molecule. Among the colloids rank hydrated silicic acid, and a number of soluble hydrated metallic peroxides, of which little has hitherto been known; also starch, the vegetable gums and dextrin, caramel, tannin, albumen, and vegetable and animal extractive matters. The peculiar structure and chemical indifference of colloids appear to adapt them for the animal organization, of which they become the plastic elements.

Although the two classes are widely separated in their properties, a complete parallelism appears to hold between them. Their existence in nature appears to call for a corresponding division of chemistry into a crystalloid and a colloid department.

Although chemically inert in the ordinary sense, colloids possess a comparative activity of their own, arising out of their physical properties. While the rigidity of the crystalline structure shuts out external impressions, the softness of the gelatinous colloid partakes of fluidity, and enables the colloid to become a medium for liquid diffusion, like water itself. The same penetrability appears to take the form of a capacity for cementation in such colloids as can exist at a high temperature. Hence a wide sensibility on the part of colloids to external agents. Another eminently characteristic quality of colloids, is their mutability. Their existence is a continued metastasis. A colloid may be compared in this respect to water while existing liquid at a temperature below its usual freezing point, or to a supersaturated saline solution. The solution of hydrated silicic acid, for instance, is easily obtained in a state of purity, but cannot be preserved. It may remain fluid for days or weeks in a sealed tube, but is sure to gelatinize at last. Nor does the change of this colloid appear to stop at that point. For the mineral forms of silicic acid deposited from water, such as flint, are found to have passed, during the geological ages of their existence, from the vitreous or colloidal into the crystalline condition (H. Rose). The colloidal is in fact a dynamical state of matter; the crystalloidal being the statical condition. The colloid possesses *ENERGIA*. It may be looked upon as the

probable primary source of the force appearing in the phenomena of vitality, as living matter without form. To the gradual matter also in which colloidal changes take place (for they always demand time as an element), may the chronic nature and periodicity of vital phenomena be ultimately referred.

For the separation of unequally diffusive crystalloids from each other, jar diffusion was had recourse to. The mixed solution was conveyed by means of a pipette to the bottom of a column of water contained in a cylindrical glass jar. A kind of cohobation takes place, a portion of the most diffusing substance rising and separating from the less diffusive substances, more and more completing as it ascends.

The separation of a crystalloid from a colloid is more properly effected by a combination of diffusion with the action of a septum composed of an insoluble colloidal material. Animal membrane will serve for the latter purpose, or a film of gelatinous starch, hydrated gelatin itself, albumen, or animal mucus. But by much the most effective septum used was paper, as it is metamorphosed by sulphuric acid (Gaine). It is now supplied by Messrs. De la Rue, and has become familiar under the name of "vegetable parchment" or "parchment paper." From sheet gutta percha a flat hoop is formed, eight or ten inches in diameter by three inches in depth, and one side is covered by a disc of parchment-paper, so as to form a vessel like a sieve. A mixed solution, which may be supposed to contain sugar and gum, is placed upon the septum to a depth of half an inch, and the instrument then floated upon a considerable volume of water contained in a basin. Three-fourths of the sugar diffuses out in twenty-four hours, and so free from gum as to be scarcely affected by subacetate of lead, and to crystallize on the evaporation of the external water by the heat of a water-bath.

The unequal action of the septum, which causes the separation described, appears to depend on this:—The crystalloid sugar is capable of taking water from the hydrated colloidal septum, and thus obtains a medium for diffusion; but the colloid gum has little or no power to separate the combined water of the same septum, and does not therefore open the door for its escape by diffusion, as the sugar does. This separating action of the colloidal septum is spoken of as *dialysis*.

Dialysis was applied to the preparation of various colloids. The mixed solution obtained by pouring silicate of soda into water acidulated with hydrochloric acid, was placed upon a parchment-paper dialyser and allowed to diffuse into water, the latter being occasionally changed. After the lapse of five days seven-eighths of the original silicic acid was found to remain liquid upon the septum, and to be so free from hydrochloric acid and chloride of sodium as not to give a precipitate with acid nitrate of silver. The true hydrated alumina, and also Mr. Crum's metalumina, were obtained soluble by dialysing solutions of these oxides in the chloride and acetate of the same metal. So also the hydrated peroxide of iron, in addition to the hydrated metaperoxide of iron of M. Péan de Saint Gilles, and the soluble hydrated chromic oxide. The varieties of prussian blue are obtained soluble by dialysing their solution in oxalate of ammonia, the latter salt diffusing away. Stannic and titanlic acids appear as insoluble gelatinous hydrates.

A solution of gum-arabic (gummate of lime), dialysed after an addition of hydrochloric acid, gave at once the pure gummic acid of Frémy. Soluble albumen is obtained in a state of purity by dialysing that substance with an addition of acetic acid.

Caramel of sugar, purified by repeated precipitation by alcohol and afterwards by dialysis, contains more carbon than any of the caramelic bodies of Gélis; it forms a tremulous jelly when concentrated, and appears decidedly colloidal. Caramel, like all other colloids, has a soluble and an insoluble modification. The latter has its solubility restored by the action of alkali, followed by that of acetic acid and subsequent dialysis.

Dialysis proves highly useful in separating arsenious acid and metallic poisons from organic fluids. Defibrinated blood, milk, and other organic fluids charged with a few milligrammes of arsenious acid, and placed upon the dialyser, were found to impart the greater proportion of the arsenious acid to the external water in the course of twenty-four hours. The diffusate was so free from organic matter, that the metal could be readily precipitated by sulphuretted hydrogen, and the quantity weighed.

Ice at or near its melting-point appears to be a colloidal substance, and exhibits a resemblance to a firm jelly in elasticity, the tendency to rend, and to redintegrate on contact.

The consideration of the properties of gelatinous colloids appears to show that osmose is principally an affair of the dehydration of the gelatinous septum under influences having a catalytic character, and that the phenomenon is independent of diffusion. The colloidal septum is capable of hydrating itself to a higher degree in contact with pure water than in contact with a saline solution. Colloidal septa, swollen in consequence of contact with dilute acid or alkali, appear to require increased sensibility to osmose, in consequence of their unusually high degree of hydration.—*London Pharm. Journ. August, 1861, from Proceedings of the Royal Society.*

ON THE COLOR TESTS FOR STRYCHNIA, AND THE DIAGNOSIS OF THE ALKALIES.

Being the substance of part of the Croonian Lectures for 1861, delivered at the Royal College of Physicians.

BY WILLIAM A. GUY, M. B., CANTAB.

Fellow of the College, and Professor of Forensic Medicine, King's College, London.

[The following is the conclusion of a series of papers published on this subject in the *Pharmaceutical Journal*. We have not space for all, and refer those of our readers who desire to examine the whole series, to that work, Vols. 2d and 3d, new series, now in course of publication.—Ed. AM. JOUR. PH.]

The last of the four questions proposed for solution in my first communication still remains to be discussed. It relates to the diagnosis of the alkaloids, and was expressed in the following terms: Is it possible by means of the color-tests, or by any simple modification of them, to distinguish the alkaloids from each other?

Before proceeding to examine this question, I must briefly refer to what I have already stated respecting the color-tests. These tests, as commonly understood, are compound tests, consisting first of the reaction of the alkaloid with sulphuric acid, and then of the reaction of the peroxides of lead and manganese, the bichromate of potash, the ferricyanide of potassium, and the permanganate of potash, with the mixture of the alkaloid and sulphuric acid.

The sulphuric acid produces in strychnia no change of color.

Hence the acid itself becomes a test of no mean value. It serves, as I shall point out more particularly presently, to distinguish strychnia from a considerable number of the alkaloids, and also from several substances which give with sulphuric acid alone colored reactions, some of which reactions with the acid alone bear a certain resemblance to those of strychnia with sulphuric acid *plus* the bichromate of potash, ferricyanide of potassium, permanganate of potash, peroxide of lead, or peroxide of manganese. In order to distinguish strychnia from other alkaloids, and from the substances to which I have just referred, it is essential that the sulphuric acid should be first applied to, and well mixed with, the strychnia, and that the absence of color having been noted, the reagents that develop the color should be in their turn applied. In all that I have said on the subject of the color-tests for strychnia, and in what I have yet to say, I assume this mode of procedure to be strictly observed; and I shall continue to speak of these reagents as the color-producing tests.

I have hitherto assumed that the sulphuric acid is applied *cold*; but I shall presently point out that we may greatly add to the value of this constituent portion of the color tests by first warming and then heating the acid solution. A very slight rise of temperature serves to develop very beautiful and characteristic colors in some of the alkaloids, while it does not change the color of strychnia. A further rise of temperature to the point of causing the mixture to give off vapor, develops color in strychnia also, and deepens or changes the tints already imparted to the alkaloids previously affected by warming the acid mixture.

The color imparted to a solution of strychnia in sulphuric acid by raising it to a temperature at which it gives off vapor is not strongly marked. It is a faint yellow or light greenish-brown, differing somewhat in depth of tint with different specimens of strychnia treated in all respects exactly alike. If the acid solution is allowed to cool, it no longer acts characteristically with the bichromate of potash or the other tests. Their action is wholly destroyed or greatly impaired. Hence, in applying the color-tests for strychnia we must use concentrated pure sulphuric acid, and use it *cold*.

So much for the first part of the color-tests. We add to the

alkaloid under examination sulphuric acid in small quantity—pure, strong and cold; and it undergoes no change of color. The alkaloid, therefore, whatever it may be, belongs to the class of which strychnia is one.

To this cold acid solution of the alkaloid we add a minute fragment of bichromate of potash, ferricyanide of potassium, permanganate of potash, peroxide of lead, or peroxide of manganese. The result is the remarkable development of successive transient, or short-lived, colors already described.

The negative reaction of strong cold sulphuric acid on strychnia, followed by the effect of heat on the acid mixture, and this by the peculiar colors produced by the application of the color-developing substances to the cold acid mixture, constitute a series of phenomena which afford fair promise of proving the means of a successful diagnosis of the alkaloids.

To this work of distinction I now address myself, and in order to prepare the way more completely for the work of tabular analysis towards which the details given in my former communication have been tending, I must again revert to the question whether the action of the color-tests on strychnia is, or is not, characteristic, and therefore diagnostic.

This is a question which must have suggested itself to every chemist engaged in medico-legal inquiries as of the utmost practical importance, and one chemist (Mr. Thomas E. Jenkins) having been employed to investigate a case of suspected poisoning, in which the color-tests gave indications of the presence of strychnia, very properly put the question to the test of experiment by applying to a variety of active principles, including most of the alkaloids, first, colorless concentrated sulphuric acid, and then a fragment of a crystal of bichromate of potash. The experiments, which were carefully performed, and appear to have been strictly comparable one with another, embraced no less than fifty alkaloids and active principles, derived from the animal as well as the vegetable kingdom, and among them urea and uric acid, and cantharidine. More than half of these substances differed from strychnia in yielding color when treated with sulphuric acid. The smaller half resembled strychnia in this respect. But not one of the whole fifty gave with the bichromate of potash the characteristic colored reactions of strychnia.

nia. Feeling that my time would not be wasted in repeating his experiments, and if possible extending them to substances not included in his list, I possessed myself (partly by the kind assistance of Mr. Morson) of all the alkaloids and similar active principles which could be obtained, and tested them in the same way. To Mr. Jenkins's list, some of which I was not able to procure, I succeeded in adding as many as sixteen new substances. None of these gave the characteristic colored reactions of strychnia, nor any succession of colors any way resembling them, so that I am now in a condition to assert that strychnia stands alone among sixty-six analogous compounds in the reactions which it gives with sulphuric acid followed by the bichromate of potash.

Mr. Jenkins (as will be seen in the table published by him in the *Chemical News* for October 6, 1860,) arranges his reactions in two columns. The first column displays the effect produced by strong sulphuric acid; the second, the changes of color caused by the addition to the acid solution of the bichromate of potash. [See page 527 for the paper of Mr. Jenkins.]

Now this table affords an excellent illustration of the absence of method and logical arrangement. The substances operated on evidently took their places as they chanced to come to hand. Strychnia itself has to be sought out; and substances which give colored reactions with sulphuric acid, find themselves in contact with others that give a negative result.

And yet the table seems to court the attention of lovers of method and logical order. It is almost impossible to keep one's hands off it. At least one would like to place the substances which are not colored by sulphuric acid by themselves, and those that are colored also by themselves. I have undertaken this work of tabulation, and, on inspecting the result, am seized with the same desire to resume the work of arrangement. In both groups their are substances which yield with bichromate of potash the same colors. Why should not these similar reactions be bracketed together? This, accordingly, I have carried into effect, and the result is a splitting up of the fifty substances into several groups of such moderate dimensions, that a man given to tabular analysis can scarcely resist the additional temptation to try whether some modification of the tests them-

selves, or some additional tests, or both together, may not lead to a successful separation and elimination of each and all the substances contained in the table.* I now proceed to lay before you in a tabular form the results of a very laborious experimental attempt to distinguish some of the principal alkaloids and active principles, whether derived from the vegetable or animal kingdom, from each other.

As the first object which I had in view was to distinguish the poisonous alkaloids and analogous active principles from each other, these substances are of course admitted into the tables; but I have added to these active principles of many of our aperient medicines and common articles of diet; and have excluded only such of those substances as were so strongly characterized by color or odor, as not to be properly grouped with the colorless, or faintly-colored, and inodorous alkaloids and active principles.† The table, divided for convenience into two, consists, as it is, of as many as thirty-five different substances, closely resembling each other in physical properties and chemical composition, and offering collectively a very difficult subject for tabular analysis. The tables, as you have them before you, are the result of a long series of experiments, and were only made to assume their present form after a great many experimental groupings and transpositions.

The first object which I had in view was to find some simple test which would divide the whole body of active principles comprised in the two tables into two principal groups. Concentrated sulphuric acid, as a constituent of the strychnia color-

* In the lectures given at the College of Physicians, Mr. Jenkins' original table, and the two tabular arrangements alluded to in the text, were sent round. These tables were the more freely used as illustrations of a want of logical arrangement, as the author evidently did not aim at diagnosis, but only at the distinct ascertainment of the peculiar and characteristic reactions of strychnia. The remarks in the text were not, therefore, intended in any respect as a censure of Mr. Jenkins for not adopting an arrangement which, for his purpose, was unnecessary. I may add, that his table comprises several substances which will not be found in the tables I am about to submit. I mean such substances as the kinic and kinovic acids, and such animal products as urea and uric acid.

† To this statement it will be seen that there are one or two exceptions, such as naphthaline, which, though colorless, has the odor of tar.

tests, was obviously well adapted to this purpose. It has the effect of dissolving the alkaloids and active principles *without change of color* in the case of one considerable group (Table I.) and *with change of color* in the case of another considerable group (Table II.) The first group (Table I.) comprises the majority of the active poisonous principles—strychnia, brucia, morphia; atropia, picrotoxia, aconitina; and the animal principle cantharidine. With these and several other alkaloids and active principles, some of which are very harmless ones, concentrated sulphuric acid either produces no change of color, or a faint yellow, straw, or buff tint.* I speak of *cold concentrated* sulphuric acid, applied as in the preliminary to the color tests for strychnia.

The next object which I had in view was to subdivide these two large groups (Tables I. and II.) each into two or more smaller groups by some second test, which might also, perchance, produce in some members of the two groups characteristic reactions, so as to eliminate or separate them at once. For this purpose I tried the effect of warming the acid solution of the alkaloids by passing the porcelain slab through the flame of the spirit lamp, so as to raise the temperature of the liquid to a point short of that at which it gives off vapor. This subsidiary test answered its purpose completely; the group of substances in Table II. which had already given colors, more or less characteristic, with the cold acid, underwent further changes of color, more or less peculiar; while the group in Table I., which had undergone no change with the cold acid, became subdivided

* I ought to state in this place that some of the alkaloids are very sensitive to heat, so that a very slight rise of temperature is followed by a decided development of color. Hence it is possible that experiments made in a cold room in winter may yield results differing somewhat from the same experiments made in a warm room in the height of summer. It must also be borne in mind that sulphuric acid, if not free from nitric acid, may impart to some of the alkaloids a tint of rose, yellow, or buff, sufficiently deep to justify their removal from Table I. to Table II. It may be well, therefore, to state that the experiments on which the tables are founded were made in the winter, in a room with a fire, but in the morning, before the temperature of the room had been raised to a point approaching summer heat; and that the acid employed was free from nitric acid.

into two leading groups, of which one continued without color, and the other underwent changes of color more or less characteristic. In the instance of meconine and of aconitina, the colors developed proved to be peculiar to these substances, so as to lead at once to their elimination from the rest.

By raising still further the temperature of the acid solutions to a point at which vapor was given off, a further separation into distinct groups or classes was found to take place. The six substances which stand first in order in Table I. still remained colorless, while the remainder assumed tints more or less characteristic. Esculine and atropia; picrotoxia, santonine and narcotina; amygdaline and naphthaline, formed themselves into three distinct groups; while strychnia, brucia and morphia gave indications of color less distinct and characteristic.

By this triple test of sulphuric acid, *cold*, *warmed* and *heated*, the active principles contained in this division (Table I.) have been either eliminated, or split up into manageable groups, awaiting the application of further tests. It seemed natural to select as the next test in order nitric acid—a known characteristic test of brucia and morphia. By applying this test to the several members of the table in succession, codeia was isolated from the group of six to which it belonged by the distinct yellow color assumed by the acid solution. Emetia was, in like manner, isolated from the other members of the same group of six, by yielding with the acid a yellow-brown color. Atropia, again, was distinguished from esculine by giving a negative result, while esculine assumed a distinct yellow color. In the same way narcotina was detached from its group of three, and naphthaline from its group of two. Again, morphia was distinguished by the rich orange hue given by the acid, together with the red fumes of nitrous acid; and brucia was effectually distinguished from strychnia by the intense red of the former contrasting with the faint tinge of red imparted to ordinary specimens of the latter. For the next eliminating test I have selected sulphuric acid followed by a solution of permanganate of potash, in the proportion of 10 grains of the salt to 3j. of water. The effect of this test on strychnia was to develop its characteristic colors, strongly contrasted with the altogether different colors given with brucia, and still more with the brown

color imparted to morphia, followed by the bleaching of the liquid. This same test divided the somewhat unmanageable group of four at the top of the table (cantharadine and asparagine, and caffeine and cinchonia) into two small groups of two each. In the first two the immediate effect of the permanganate was a red-brown color; in the second, a pink. Picrotoxia and santonine gave the same color (pink) and remained undistinguished. The last and ultimate work of elimination was effected by means of heat applied to the active principle in its solid state. Cantharidine was found to be wholly dissipated by the heat of the spirit lamp, while asparagine gave a bulky carbonaceous deposit. And caffeine was found to present the same difference when compared with cinchonia. Lastly, picrotoxia was found to be distinguished from santonine by the bulky carbonaceous residue with the first, and the scanty deposit of carbon with the second.

Having by this succession of tests obtained a clue to the active principle with which we have been dealing, we should proceed to identify the substance indicated by the table, through its own characteristic tests.

In the second division of the one large table of elimination, or that which comprises active principles colored by contact with cold sulphuric acid, (Table II.,) the same succession of tests is employed. Cold concentrated sulphuric acid at once separates this group of seventeen into eight smaller groups of one, two or six; and the subsequent warming and heating of the colored acid solutions occasions such marked differences of color as to nearly complete the work of elimination. But I have added columns showing the effect of nitric acid, and of the solution of permanganate of potash. The application of heat to the alkaloids themselves did not prove necessary to the work of elimination.

I submit these tables primarily as specimens of *Tables of Elimination*; but also incidentally as tables which may prove serviceable to the Chemist. I am not certain that they constitute the best aid which could be devised to the diagnosis of the alkaloids. I thought that they might, perhaps, admit of being simplified by adding to the three columns headed "sulphuric acid" a fourth, showing the deposit of carbon resulting from the continued application of heat to the acid solution of the al-

kaloid. I tried this reaction in the case of fourteen alkaloids and active principles, comprising all the more active poisons of this class, together with the less important principles, emetia and meconine, and found the alkaloids to differ from each other in the amount of carbonaceous deposit. With strychnia, aconitina and veratria, for instance, the deposit of carbon was less abundant than with brucia, morphia, atropia and the other poisonous alkaloids. But the difference was not such as to justify me in using it as a diagnostic property. So also with the direct application of heat to the alkaloids themselves. Strychnia, morphia, atropia, cantharidine, meconine, picrotoxia and delphinia, after melting, deposited but a scanty carbonaceous ash; while emetia, aconitina and digitaline yielded an abundant ash; and brucia, elaterine, veratria and solanine, yielded an ash intermediate in quantity. This test, again, though fairly applicable to the few cases in Table I., did not seem admissible as a diagnostic on a larger scale. Indeed, the tables, though carefully compiled and based on carefully conducted experiments, are open to the obvious objection that, with different specimens and different quantities of the alkaloids, and with different specimens of sulphuric acid, we may obtain differences of tint, and more or less ready development of color under increase of temperature. The majority of the reactions, however, will, I believe, be found constant for all specimens of fair average purity. One alkaloid, hyoscyamia, which I was not able to procure, is omitted.*

Of the two tables, Table I. affords the best illustration of a table of elimination. For the sake of brevity, and for other reasons already explained, the figures 1, 2, 3, are added to the words describing the colors developed by the tests. These figures indicate different degrees of intensity. In comparing strychnia with brucia, for instance, the figure (1) attached to the word "yellow" opposite strychnia in the third column means a faint yellow color, less in degree than that indicated by the figure (2) opposite brucia in the same column. So the word "brown" with the annex 3 in the same column opposite escu-

* In the lectures at the College of Physicians a table was used which showed the colors actually produced by the action of the several reagents on these poisonous alkaloids and active principles.

line and atropia indicates an intense brown color; the words red³ and orange³ in the column headed nitric acid indicate intense red and orange respectively.

TABLE I.

ALKALOIDS, &C., GIVING NO COLOR WITH COLD SULPHURIC ACID.

Alkaloids, &c.	Sulphuric Acid.			Nitric Acid.	Sulphuric Acid, followed by the solution of Permanganate of Potash.	Heat.
	Cold.	Warm.	Hot.			
Cantharadine	0	0	0	0	Red brown.....	0
Asparagine.....	0	0	0	0	Red brown.....	Carbon ³
Caffeine and Theine	0	0	0	0	Pink.....	0
Cinchonia.....	0	0	0	0	Pink.....	Carbon ³
Codeia	0	0	0	Yellow		
Emetia.....	0	0	0	Yellow-brown		
Strychnia	0	0	Yellow ¹	Pink ¹	Blue, mulberry, orange	
Brucia	0	0	Yellow ²	Red ³	Red, brown, orange, yellow	
Morphia	0	0	Brown	Orange ³	Br'n, then bleached	
Esculine	0	0	Brown ³	Yellow		
Atropia.....	0	0	Brown ³	0		
Meconine.....	0	Blue				
Aconitina.....	0	Brown				
Picrotoxia.....	0	Yellow	Brown	0	Pink.....	Carbon ³
Santonine.....	0	Yellow	Brown	0	Pink.....	Carbon ¹
Narcotina.....	0	Yellow	Claret	Yellow		
Amygdaline.....	0	Pink	Brown	0		
Naphthaline.....	0	Pink	Brown	Yellow		

TABLE II.

ALKALOIDS, &C., GIVING COLOR WITH COLD SULPHURIC ACID.

Alkaloids, &c.	Sulphuric Acid.			Nitric Acid.	Sulphuric Acid, followed by the solution of the Permanganate of Potash.
	Cold.	Warm.	Hot.		
Veratria	Orange ³	Scarlet	Claret	0	
Piperine	Orange ³	Red-brown	Green ³	Orange ³	
Delphinia.....	Pink ¹	Pink ²	Brown	0	Yellow ¹
Salicine.....	Pink ¹	Pink ³	Claret	0	Claret
Digitaline.....	Red-brown ¹	Red-brown ²	Red-brown ³	0	Buff
Elaterine.....	Red-brown ¹	Red-brown ²	Red-brown ³	0	Pink ³
Papaverina...	Purple ³	Purple ²	Purple ¹	Yellow	Green; slate
Paramorphia..	Purple ¹	Purple ¹	Purple ³	Yellow	Green; brown
Quinia	Yellow	Yellow	Yellow-brown	Yellow	
Aloine	Yellow	Yellow ³	Green	Orange	
Jalapine	Yellow	Orange ³	Red-brown	Yellow	
Narceine	Yellow	Red-brown ³	Red-brown ³	Green-brown ³	Buff
Phloritzia.....	Yellow	Red-brown ³	Red-brown ³	Red-brown ³	Pink ³
Solanina.....	Yellow ³	Brown ³	Brown ³	0	
Cubebine.....	Pink			Yellow	
Quinoidin.....	Brown	Brown	Brown	0	
Sanguinarina	Red-brown	Claret	Claret	Red-brown ²	

ON THE DETECTION OF STRYCHNIA AND OTHER VEGETABLE AND ANIMAL PROXIMATE PRINCIPLES.

BY THOMAS E. JENKINS.

The writer having been employed in the month of September, 1855, to investigate chemically, a case of suspected poisoning, a course of analysis was entered into, the result of which indicated the presence of strychnia in the contents of the stomach.

One set of reactions which pointed to this poison, was the coloration produced by oxidizing agents; these re-agents, although said by many chemists to be characteristic tests for strychnia, were not certainly known to be so by me, for the simple reason that I had not tried and seen their effects upon the various organic principles which were accessible to me. To satisfy myself upon this point, the following experiments were made.

It was not deemed necessary to use more than one of the oxidising agents commonly employed for the purpose, because the results produced are substantially the same whether the oxidation be produced by one or the other of them.

The manner of making these experiments was simply to mix on a white porcelain surface about the twentieth of a grain of the organic substance with one or two drops of colorless *concentrated sulphuric acid*, allowing them to remain in contact for a few moments, then testing with a small fragment of a crystal of *bichromate of potassa* drawn through the solution or mixture.

With many of the principles, the sulphuric acid reacted powerfully with the development of beautiful, and, in several instances, intense colors. These I have noticed, as well as those produced by the subsequent action of the bichromate of potassa.

In these experiments I have disregarded all changes except those resulting in the production of colors or their mutations.

In point of time, quantity of substance tested, and mode of operating, the experiments were all as nearly alike as possible.

The proximate principles which I employed were pure and nearly all in crystals.

The changes in color are given in the order in which they occurred.

Proximate Principles.	Color produced by Sulphuric Acid.	Color produced by Bichromate of Potassa.
Morphia,		Brown, green.
Narcotia,	Canary yellow,	Brown, dirty green, blue.
Ononine,	Light orange,	Brown, dirty green, blue.
Papaverina,	Purplish red,	Greenish yel. dk. green.
Peucedanine,	Lemon yellow,	Dirty yellow.
Phloridzine,	(evanescent,)	Yellow, green, bluish.
Picrotoxia,	Orange yellow,	Yellow, green.
Rheine,	Intense red,	Muddy, green.
Piperine,	Bromish red,	Dirty, green.
Salicine,	Rose red	Brown, quickly green.
Santonine,		Yellow.
Strychnia,		Blue, purple, red, orange
Theine,		Slight brown yellow.
Theobromine,		Slight brown yellow.
Caffeine,		Light yel. green, brown.
Urea,		Yellow, no change.
Veratria,	Intense brown red,	Brownish yellow, green.
Aconitia,	Brown,	Brownish green, bluish.
Anemonine,		Yellow.
Asarine,	Brownish red,	Brown, dirty green.
Atropia,		Yellow.
Cantharadine,		Yellow.
Codeia,		Green.
Delphinia ¹ ,		Orange, brown, green?
Columbine,	Brownish yellow,	Brown.
Daturia,	Yellow,	Evanescent pink, green.
Digitaline,	Brown,	Yellow, green.
Elaterine,	Brown,	Brownish, yellow.
Emetia,	Brown,	Muddy yellow, green.
Gentianine,	Yellow,	Yellow.
Mecconine,	Yellow,	Yellow, green.
Sanguinarina,	Red,	Brown.
Solanine,	Orange,	Yellow, green.
Cinchonia,		Light, green.
Quinia,		Light, green.
Quinidia,		Green.
Bebeerina,	Brown,	Brown, green.
Esculine,		Brown, dark green.
Amygdaline,	Rose red,	Brown, light green, blue
Berberina,	Brownish yellow,	Deep red, brown. [yel.
Brucea,		Bright, brick red, green,
Cetrarine,	Brownish yellow,	Brownish yellow, green.
Cubebine,	Beautiful red,	Yellowish green,
Hæmatoxyline,	Orange, dark brown, red,	Dark, brown.
Indigotine,	Dark greenish blue,	Orange.
Kinovic Acid,	Yellow,	Pink, green.
Kinic “		Green.
Gallie “		Green.
Carbazotic “		Brown.
Uric “		Yellowish, green.

¹The result of one experiment.

Nearly all left a green coloration on the spot after the lapse of twenty-four or forty-eight hours, owing to the reduction of chromic acid to sesquioxide of chrome.

These and other observations I have made in regard to vegetable proximate principles, convince me of their general and powerful deoxidising properties, as well as the establishment of the fact that the "*color test*," or "*oxidising test*," is not only delicate but characteristic, and consequently reliable. In reference to the delicacy of the "*color test*," I found that when one grain of pure strychnine was dissolved in 400,000 drops of distilled water, and one drop of that solution was allowed to evaporate to dryness on a glass plate, not only were the crystals of strychnine revealed by the microscope, but on the addition of a small drop of very white concentrated sulphuric acid, and the subsequent application of the point of a spicula of bichromate of potassa, the characteristic colors were brought out.—*Chemical News, London, Oct. 6, 1860.*

ON THE SOLIDIFICATION OF CARBONIC ACID.

By MM. A. LOIR and Ch. DRION.

In a paper read before the Academy, June 2, 1860, we stated that atmospheric pressure liquefies carbonic acid when its temperature is reduced to the point at which liquid ammonia evaporates *in vacuo*. By slightly modifying the conditions of the experiment, we have succeeded in solidifying carbonic acid with the aid of an apparatus as simple as those daily employed in chemical laboratories. This hitherto dangerous and costly operation may in future be easily repeated to a chemical class.

If liquid ammonia is introduced into a glass globe, and the interior of this put in communication with a good air-pump, by the intervention of a vessel containing coke impregnated with sulphuric acid, the temperature of the liquid is rapidly reduced from the first strokes of the piston. The liquid begins to solidify towards 81° ; it soon becomes a mass, and if the air-pump allows the reducing of the pressure to about a millimetre of mercury, the temperature of the solid ammonia becomes lowered some degrees more and reaches 89.5° . This suffices to deter-

mine the liquefaction of carbonic acid under atmospheric pressure. We have, in fact, proved that carbonic gas liquefies by passing a current of the dry carbonic acid gas into a small U shaped tube, immersed in ammonia; but as the temperature obtained is only a few degrees below that of saturation, we get only a small quantity liquefied. If, on the contrary, a slight elevation of pressure is employed, the experiment becomes easy, and yields in a short time notable quantities of solid carbonic acid. The following is the manner of operating: Introduce about 150 cubic centimetres of liquid ammonia into a reversed glass receiver, the sides of which are cemented to a plate with two holes. In the central opening fit a glass tube, closed internally, and reaching the bottom of the receiver, the other opening serving to place the interior of the receiver in communication with the pneumatic machine. Carbonic acid is produced by heating previously-dried bicarbonate of soda in a copper retort, the neck containing fragments of chloride of calcium. One part of this retort communicates by a leaden tube on one hand with the tube which is immersed in liquid ammonia, on the other hand with a small manometer of compressed air. The air being previously expelled from the apparatus, and the temperature of the ammonia lowered to about the point of solidification, the retort is heated, noting meanwhile carefully the pressure. The pressure is thus maintained between three and four atmospheres. Rapidly augmenting transparent crystals soon appear on the sides of the interior tube, so that in about half an hour all that portion of the tube which is plunged in ammonia becomes covered with a thick stratum of crystals (about 25 grammes.) The experiment may then be concluded and the apparatus dismantled.

Solid carbonic acid, obtained under the above-mentioned conditions, appears a colorless mass as transparent as ice. It is easily detached from the sides of the condensing tube by means of a glass rod; it then divides into large cubic crystals, each side about three to four millimetres. Exposed to the air, these crystals slowly return to their gaseous state; they evaporate, leaving no residue. Placed on the hand, they communicate no immediate sensation of heat or cold; they are with difficulty held in the fingers, and with a slight pressure escape as if cov-

ered with an unctuous matter. If one of these crystals is kept between the thumb and forefinger, it soon produces an intolerable burning.

An experiment was performed by placing a certain quantity of solid carbonic acid in a small glass tube communicating with a receiver filled with mercury. After some time the crystals disappeared, leaving no residue, while the receiver was filled with perfectly pure carbonic gas, capable of being completely absorbed by potash. Mixed with ether in a small porcelain crucible, these carbonic acid crystals yield a freezing mixture of a temperature of 81° .

As a conclusion to these summary indications, we will add that the liquid ammonia used in our experiments was prepared by M. Bussy's process—that is to say, by acting on ammoniacal gas in a globe surrounded with liquid sulphurous acid, the evaporation of which is expedited by an air-pump. By this method nearly two decilitres of liquid ammonia can be easily obtained in less than two hours.

We determined the temperatures here indicated by means of an alcoholic thermometer, on which we marked two fixed points—that is to say 0° at melting ice, and 40° at the temperature of melting mercury.—*Lond. Chem. News*, July 13, 1861, from *Comptes Rendus*.

ON AN IMPROVED METHOD OF PREPARING SODÆ CARBONAS SICCATA.

BY HARRY NAPIER DRAPER, F. C. S. L.

The directions of the three British Pharmacopœias for the preparation of dried carbonate of soda are in almost every respect alike. Crystals of carbonate of soda are exposed to the action of heat until the whole of their water is dispelled. This process has two disadvantages: 1. The carbonate of soda of commerce, which is always used in practice to the exclusion of the pure product of the Pharmacopœias, invariably contains sulphates and chlorides. These, are, of course, found also in the dry salt. 2. The hard cake which results from the desiccation of the crystals is extremely difficult to powder, and never makes a really elegant preparation.

Both these inconveniences may be remedied by the substitution of bicarbonate of soda for the carbonate. When this salt is heated to redness, it, as is well known, loses one of its two equivalents of carbonic acid and all its water, a pure mono-carbonate remaining. Bicarbonate of soda of commerce is nearly always almost pure, never, as far as my experience goes, containing more than slight traces of chlorides and sulphates. When not heated beyond redness, the resulting carbonate is not hard, but, on the contrary, is a loosely cohering perfectly white powder. The slight difference in the cost of carbonate and bicarbonate is of small moment when compared with the saving of time and trouble, and the superiority of the dried carbonate made from the latter salt.—*Lond. Chem. News*, July 13, 1861, from *Dublin Medical Press*.

CARBONATE OF POTASH.

The amount of water which carbonate of potash contains has been debated by several chemists. Wackenroder, Phillips, Bérard and Giese, and now Dr. J. J. Pohl (*Sitzungsber d. Akad. der Wissensch. zu Wien.*, bd. xli. s. 630) have severally examined the salt with a view to its determination. The last found in a saturated solution of potash which had been kept in a stoppered bottle for more than a year, some six-sided crystals which, removed into the air, quickly attracted moisture and liquefied. The qualitative analysis of these crystals showed them to be composed of potash, carbonic acid, and water, with mere traces of chlorine and sulphuric acid. When heated to 100° C. they lost 5.180 per cent. of water. Further investigations showed that they contained considerably more water, which could only be expelled by a much higher temperature. The salt dried over sulphuric acid lost, when heated to redness, 15.994 of water, and had the following composition :—

Carbonate of potash	. . . . .	83.517
Water	. . . . .	15.994
Chlorine, sulphuric acid, and loss	. . . . .	0.489
		<hr/>
		100.000

This closely approaches the formula $2(\text{KO}, \text{CO}_2) \cdot 3\text{HO}$, which

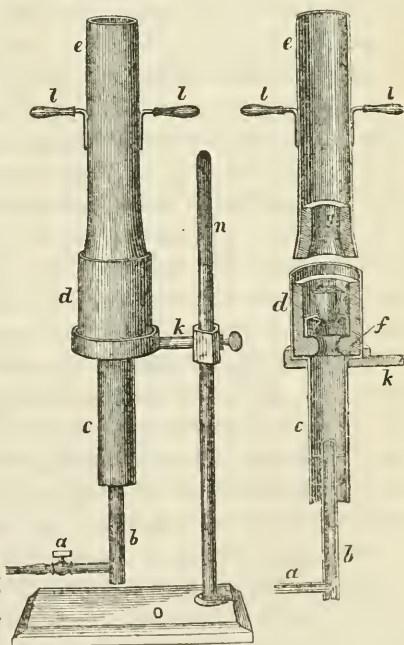
would give in a hundred parts carbonate of potash 83.676, water 16.324. As, however, the water expelled above 100° was only 10.814, the author decides that the salt was $\text{KO}, \text{CO}_2\text{HO}$ and the excess of water hygroscopic moisture. When exposed to the air this salt quickly attracts 4.5 more water, and then has the formula $2(\text{KO CO}_2)3\text{HO}$. By taking up a very small quantity more water the salt liquefies to an oily fluid.—*London Chem. News*, June 22, 1861.

GRIFFIN'S REVERBERATORY GAS FURNACE, FOR ANALYTICAL OPERATIONS WITH PLATINUM CRUCIBLES.

This apparatus produces a high temperature without the use of a blowing-machine. It is especially suitable for the decomposition of silicious minerals by fusion with alkaline carbonates in platinum crucibles, being capable of fusing 1000 grains of anhydrous carbonate of soda in ten minutes.

The furnace is represented by the annexed engraving. It consists essentially of a combination of tubes, within which a mixture of coal gas and air is burnt, and in which a small fire-clay or plumbago furnace holds the crucible in the point of greatest heat.

Letter *a* represents a brass tube and stop-cock of $\frac{1}{4}$ inch bore, for the supply of coal-gas at ordinary pressure. The end of it, fixed within the tube *b*, is pierced with several small holes for the emission of the gas. The brass tube *b* is 9 inches long and 1 inch bore, open at both ends. The iron tube *c* is 8 inches long and $2\frac{1}{4}$ inches



inches long and $2\frac{1}{4}$ inches diameter, open at both ends, but

joined at the top to the iron body of the furnace, *d*. This body is 4 inches high and 4 inches in external diameter. The iron tube *e*, made conical at the lower end, is 15 inches long, $2\frac{3}{4}$ inches wide at the top, and $3\frac{1}{2}$ inches wide at the bottom. The body of the furnace, *d*, is fitted with a lining of fire-clay or plumbago, the upper part of which is cylindrical, with a bore of $2\frac{1}{2}$ inches, and the lower part forms a massive diaphragm, with a central opening of $1\frac{1}{2}$ inches, as shown by *f* in the section. Upon this diaphragm is loosely placed a cast-iron ring with three knife-edges, represented in the section and separately by the figure *h* and *i*, the use of which is to support crucibles. By reversing this ring it can be made to suit crucibles of different sizes. In the lower part of the chimney, *e*, a reverberatory dome of fire-clay or of plumbago is fixed. This serves to deflect the flame downwards upon the top of the crucibles. The space provided in the body of the furnace for the reception of crucibles is $2\frac{1}{2}$ inches wide and $2\frac{1}{4}$ inches high, and it will take in a crucible of nearly those dimensions.



The furnace is supported by a flanged iron ring, *k*, attached to a triangular socket, which can be screwed on the $\frac{5}{8}$ inch rod of an ordinary iron retort stand, as represented by *n*, *o*.

The gas, entering the furnace by the supply-pipe, *a*, mixes with the air, which rises through the lower end of the tube *b*, and burns with a smokeless flame when lighted at the upper end of that tube. This flame is then supplied with additional air by the lower end of the tube *c*, a great draught being produced by the action of the tall and wide chimney, *e*. When the pressure of the gas is strong, the flame reaches from the tube *b* to the top of the chimney *e*, being in that case two feet long. The point of greatest heat is at 8 or 9 inches above the upper end of the tube *b*, and the arrangement of the furnace is such as to fix the crucible in the focus of the heat. The condition of the crucible can at any time be seen on lifting the dome and chimney *e*, by means of the handles *l*, *l*.

The amount of gas supplied to the furnace is regulated by the stop-cock *a*, from which a flexible pipe should lead to a second stop-cock, attached to a fixed gas-pipe. The latter should be opened wider than is necessary to supply the furnace with

gas. The pressure should then be regulated by the stop-cock *a*. This arrangement prevents, to some extent, the blowing down of the flame when the pressure of the gas in the pipe beyond the fixed stop-cock happens to be suddenly lessened.—*London Pharm. Journ. May, 1861.*

CHEMICAL STONE-WARE MANUFACTURE.

The manufacture of Chemical Stone-ware has latterly assumed so high a degree of importance that we have thought it desirable to bring before our subscribers the following account of the various materials employed, the different processes to which they are subjected, and the numerous uses to which the manufactured articles can be applied. We have, therefore, paid a visit to the potteries of Messrs. J. Cliff and Co., Princes street, Lambeth, and, by the kind courtesy of the firm, have been enabled to trace the various steps of the manufacture, from the reception of the raw material to its conversion into the finished article.

The materials employed are chiefly white clays, obtained from the counties of Devon and Dorset, with a certain amount of kaolin, or China clay, from Cornwall; and for glazing purposes a proportion of Cornish stone, felspar, &c. To the former are added sand, ground flint, and other clays of a more or less infusible character, according to the quality of body required, from Maidstone Wortley, near Leeds, and Newcastle-on-Tyne; and for certain kinds of ware a large proportion of pounded broken earthenware, technically known as rough stuff, or grit, is used.

On referring to the "Mineral Statistics," published by the Geological Museum, we find that the various kinds of pottery and fire clay produced in England alone in the year 1858, amounted to upwards of four hundred thousand tons, and that the estimated value was nearly three hundred thousand pounds. These totals do not include the clays used for the manufacture of bricks and tiles.

The Devonshire clays are purer than those of Dorset, and are used for the manufacture of the smaller wares. Those of Dorset contain a certain admixture of lime and iron, rendering them less pure, and consequently of less value. They are used in

combination with a certain amount of the Devon and Dorset clay for the larger vessels.

The articles intended for the use of chemical manufacturers require great care in making and burning, both as to the proper proportions of the materials employed and their due admixture. These vessels have frequently to resist the action of the strongest acids, and that at a high temperature, consequently it is absolutely necessary that they should admit of a certain amount of expansion and contraction without breaking. This quality is obtained by the mixtures of complex materials, that of each manufacturer varying from the other.

The clays employed at these potteries are sent from the pits in cubical tesses, weighing usually about thirty-five pounds each. After having been well dried these are reduced to powder in a crushing mill. The due admixture requisite to form the articles required is then thrown into a pug mill, which is an upright cylinder, about six feet deep by two in diameter, having a perpendicular shaft running through it. This shaft, which is caused to rotate by steam power, has a number of blades set on it, forming a kind of screw. These arms or blades so work amongst the powdered clays, &c., &c., as to mix them intimately with the water admitted, at the discretion of the workman, into the cylinder through a pipe, and, by their continued action, to force it out of the bottom in a plastic state of such uniform consistency, and so free from bubbles of air, that it is fit for the thrower, who fashions it into the required form on the potter's wheel. This is a kind of lathe, formed of a shaft, having a vertical instead of the usual horizontal position. On the upper extremity of the upright shaft of this lathe is fixed a small circular disk, which revolves with it. On this disk the workman places the lump of prepared clay, and, by pressure with his hands, aided by a few simple tools, fashions this yielding material into any required shape with a truly marvellous degree of dexterity and rapidity. It is with the aid of this simple contrivance that almost all circular articles are made, from penny ink-bottles, which are sold at 2s. 6d. per gross, to the enormous vessels manufactured by Messrs. Cliff, some of which are capable of holding 800 gallons.

The vessels having been made, are placed in the drying-room to

become thoroughly dried ; after which, those termed double-glazed stone-ware, such as spirit cans, druggists' pots, &c., are dipped in liquid glaze, and taken to the kiln to burn. This, as usually constructed, is a large circular room, about ten to fifteen feet in diameter, and fourteen feet high. It is lined with the best Wortley fire-bricks, and has at its sides a number of openings to admit the heat from the fires. It has also apertures in the roof to allow the escape of the waste heat and smoke. The articles to be burnt are placed in the kiln, piled up on one another, as is the case with small goods, or, if large, singly on slabs or quarries. The opening is then built up and carefully cemented over, when the fires are lighted, and are gradually increased until every article in the interior becomes heated to an intense white heat, which process takes, with a fifteen-foot kiln, from forty to fifty hours, consuming ten tons of coal. If the articles are to be salt-glazed, a quantity of very coarse salt is thrown in through the holes left in the roof of the kiln, and into each fire-hole, shortly before the termination of the firing. This is at once converted into vapor by the intense heat, and is decomposed. The soda of the salt unites with the silica of the clay, and forms a fusible glass or glaze upon the surface. So perfect is this glazing, that articles thus protected have been found to resist for twenty years without deterioration the action of the nitrous acid of commerce. After the glazing operation the kiln is carefully stopped, to prevent draughts or cold air, and is then allowed to cool for thirty to forty hours before it is opened and the articles removed.

For other kinds of glazing a different process is employed, the vessels being dipped into a composition of materials that melt during the firing into the kind of glaze required. It may be noticed, that many stone-ware articles are of two colors—as, for example, a brown top with a buff-colored base ; the darker top given by the addition of a proportion of manganese to the glaze.

Messrs. Cliff have introduced several improvements into the process of firing in their patent kiln. For instance, the articles are not exposed to the direct action of the fire, but are enclosed in an inner kiln, the fire playing between the two, and the draught also traversing numerous hollow pipes which are con-

nected with a hollow bottom communicating with the furnace, and support the shelving in the interior ; thus the articles are raised to the required temperature without being exposed to the immediate action of the flames, and are burnt and cooled quicker, and more evenly than by the old process, while at the same time it holds more goods, and has much less gear to remove each charge.

Among the articles manufactured at Messrs. Cliffs' that are more immediately interesting to our subscribers, we may mention the condensing worms, found in all sizes from 18 to 54 inches in height, and from $\frac{5}{8}$ inch to upwards of three inches bore, stills, taps, bowls, &c., &c., the materials of which these are manufactured varying almost with every variety. The worms are built up by curving the required diameter of pipe to the proper circle sufficient for one coil ; these are, when stiff or "green," built up one over the other to the height required.

In connection with the subject of distillation, we may state that we saw in the process of manufacture a huge condenser, consisting of a series of pipes, each six feet in length by three and a half inches in diameter, to be joined by curved end pieces. Amongst other large sized novel articles we noticed several stone-ware rollers each six feet long, to be used by paper-makers. These had a splendid face, and were most valuable as not being liable to be acted upon by the chlorine used in bleaching the pulp.

So numerous are the chemical wares, such as bottles, receivers, stone jars, percolators, tincture jars, &c., &c., that we can only allude to a few. The adaptation of the spherically ground air-tight stopper to openings of all sizes, even up to eighteen inches or two feet in diameter, renders these wares much more useful to chemists than they would be otherwise, as when used for tincture jars, percolators, and spirit barrels, they possess the advantage of not allowing the loss of any spirit by evaporation, and are easily worked, all the trouble required being that they are kept *clean*.

These spherical stoppers are turned in a lathe, and are fitted to the jars, after being burnt, by grinding with fine emery powder, each jar and lid being afterwards lettered to correspond.

The adaptation of these air-tight lids to stone-ware jars of

all sizes, is of great advantage to the holders of volatile drugs, and those liable to spoil by exposure to the air. It would be impossible to enumerate all the useful implements and appliances that are made of stone-ware, from bottles at less than a farthing each, and cheap infusion pots at 9d. each, to the condensing worm at six guineas, and vessels of enormous bulk at a much greater price.—*Chemist and Druggist*, July 15, 1861.

OZONE AS A MEANS OF RESTORING OLD AND FADED ENGRAVINGS, &c.

According to v. GORUP-BESANEZ, ozone when properly applied is a most effective and convenient agent for restoring books or prints which have become brown by age, or been soiled or smeared with coloring matter; only a short time being required to render them perfectly white, as if just from the press, and this without injuring in the least the blackness of the printer's ink or the lines of crayon drawings.

As examples of his results the author mentions a book of the sixteenth century upon a page of which several sentences had been painted over, by the monks of that epoch, with a black, shining coloring matter in order to render them illegible, and of which no trace of a line could be detected. After 36 hours treatment with ozone the coloring matter was entirely destroyed, and the most careful scrutiny of the page would have failed to discover that any of the lines had once been painted over. In like manner a wood cut of Durer which had been besmeared with a dark yellow color was completely restored.

Writing ink may be readily discharged by ozone, especially if the paper be subsequently treated with very dilute chlorohydric acid to remove the oxyde of iron.

Printer's ink is not attacked by ozone to any appreciable extent unless the action be long continued. Vegetable coloring matters are completely removed by it, but metallic coloring matters, grease spots and stains produced by fungi cannot thus be destroyed.

As applied in the small way, the method consists in placing a bit of phosphorus about 3 inches in length and $\frac{1}{2}$ an inch in di-

ameter, the surface of which has been scraped bright, in a wide necked glass carboy, or other large hollow vessel, pouring in as much water, at about 30° (C.), as will half cover the phosphorus, closing the vessel with a cork, and allowing the whole to stand until the jar is charged as strongly as possible with ozone, which ordinarily occurs after 12 or 18 hours. Then without removing the phosphorus or water, the paper to be bleached, which has been moistened with water, rolled up, and fastened to a platinum wire in a suitable manner, is hung in the middle of the vessel. The cork is now restored and the apparatus left to itself. The roll of paper is soon surrounded with the fumes arising from the phosphorus, and the stains gradually disappear. The rapidity of the operation of course depends upon the nature of the substance to be discharged—three days having been the longest time required in any of the experiments. Prints which had merely become brown by age and those stained with coffee usually became perfectly white and clean in the course of 48 hours. The action of the ozone, however, must not be continued too long lest some of the finer lines of the engraving should be injured. After all the spots have disappeared, the paper is strongly acid, and if allowed to dry when in this condition would become exceedingly brittle and also dark colored. It is consequently necessary to remove the acid completely. In order to accomplish this the paper is placed in water which is frequently renewed and allowed to lie there until a bit of blue litmus paper pressed against it is no longer reddened. The paper is then passed through water to which a few drops of a solution of soda have been added and is spread upon a glass plate, this is slightly inclined, and a fine stream of water is allowed to flow over the paper during 24 hours. After the paper, on exposure to the air, has become dry enough to remove from the glass without danger of tearing, it is taken off and pressed dry between folds of filter paper.

The author remarks that in case the process were attempted on a larger scale it would probably be well to have glass troughs or boxes blown of the desired form, since it is not easy to prepare suitable vessels by any process of fastening together pieces of glass, the cement being attacked by ozone.

Attempts to apply ozone in restoring oil paintings gave only negative results, the action having been irregular.—*American Journal of Science and Arts*, September, 1861, from *Annalen der Chemie und Pharmacie*.

NON-INFLAMMABLE CLOTHING.

Dr. Odling, of Guy's Hospital, in a letter addressed to a contemporary, on the subject of the recent crinoline accidents, gives the following valuable information on the effects of certain salts upon fabrics:—The various means proposed for rendering textile fabrics non-inflammable were carefully investigated a short time back by two well-known chemists, Messrs. Versmann and Oppenheim. An account of their experiments was read at the Aberdeen meeting of the British Association, in 1859, and was afterwards published in the *Journal of the Society of Arts*, and in a separate form by Trübner and Co., of Paternoster-row. They showed that linen and cotton goods dried after immersion in a solution of one or other of several salts possessing the property of non-inflammability, and that the best results were obtained with a solution of sulphate of ammonia, or of tungstate of soda, neither of which liquids produced any injurious effect upon the tissue or color of the fabric. The tungstate of soda solution was found most applicable to laundry purposes, on account of its not interfering in any way with the process of ironing. Muslins, &c., steeped in a 7 per cent. solution of sulphate of ammonia, or a 20 per cent. solution of tungstate of soda, and then dried, may be held in the flame of a candle or gas lamp without taking fire. That portion of the stuff in contact with the light becomes charred and destroyed, but it does not inflame, and consequently the burning state does not spread to the rest of the material.—*Chemist and Druggist*, London, August, 1861.

ACTION OF SULPHATE OF COPPER WHEN EMPLOYED AS A PRESERVATIVE OF WOOD.

Koenig has investigated the chemical reactions which occur when wood is impregnated with a preservative solution of blue vitriol. He finds as a general rule, that a certain quantity of

basic sulphate of copper remains combined in the pores of the wood in such a manner that it cannot be washed out with water. The copper salt may be seen by its green color in the spaces between the yearly rings in the less compact portions of the wood, that is to say, in those portions which contain the sap. Those varieties of wood which contain the most resin retain the largest amount of the copper salt,—oak, for example, retaining but little of it. The ligneous fibre itself appears to have little or nothing to do with the fixation of the copper salt, and indeed none whatever is retained in chemical combination, so that it cannot be washed out with water, by pure cellulose. When wood from which all resin has been extracted by boiling alcohol, is impregnated with sulphate of copper, it does not become colored like the original resinous wood, and the copper salt contained in it may readily be washed out with water. In like manner, from impregnated resinous wood all the copper salt may be removed, with the resin, by means of alcohol.

The constituents of the blue vitriol are consequently fixed in the wood by means of the resin which this contains.

Further, it is found that the impregnated wood contains less nitrogen than that which is unimpregnated, and that it is even possible to remove all the nitrogenous components of the wood by long continued treatment with the solution of sulphate of copper. The nitrogenous matters being soluble in an excess of this solution, just as the precipitate which forms when aqueous solutions of albumen and sulphate of copper are mixed, is soluble in excess of the latter. Since the nitrogenous matters are well known to be promoters of putrefaction, their removal readily accounts for the increased durability of the impregnated wood.

The author hopes to explain in a similar manner the action of other salts, like chloride of zinc, &c., which are used for preserving timber, and is now engaged in investigating the question.

The utility of blue vitriol as a preservative may also depend in a measure upon the resinous copper salt which is formed, by which the pores of the wood are more or less filled up, and the ligneous fibre covered so that contact with the air is prevented, and the attacks of insects hindered. It is suggested that those cases in which the anticipated benefits have not been realized in practice by impregnating wood with a solution of blue vitriol,

may probably be referred to the use of an insufficient amount of this agent—i. e., where the wood was not immersed in the solution for a sufficient length of time. The action should be one of lixiviation, not merely of absorption.—*Silliman's Journal*, from *Programm der Realschule zu Leipzig*, 1861; *Böttger's polyt. Notizblatt*.

ON THE ESTIMATION OF COMMERCIAL SALTPETRES,

BY M. J. PERSOZ.

The best method for estimating the water is to melt carefully from 50 to 200 grammes of nitre in a platinum capsule, taking care that the temperature is not raised much above the fusing point. Weigh the crucible immediately after cooling. If the saltpetre contains nitrate of lime or magnesia, add about 1 gramme of well-dried neutral chromate of potash, which prevents loss of nitric acid from these nitrates, so easily decomposed by heat.

To estimate insoluble matters, treat the melted mass with water, so as to form a determinate volume of solution N. Filter this carefully; collect, wash, and weigh the insoluble precipitate.

Gay-Lussac's method employed for the estimation of chlorides is to use two standard solutions, one containing 27 grammes and the other 2.7 grammes of pure silver to the litre. Each cubic centimètre of the stronger solution corresponds to 0.01466 grammes of chloride of sodium or 0.01864 grammes of chloride of potassium.

To estimate sulphates, a standard of chloride of barium is used, containing 259.8 grammes of salt, each cubic centimètre representing 0.179 grammes of sulphate of soda, or 0.208 grammes of sulphate of potassa. The operation is conducted in the following manner:—Measure 200 cubic centimètres of the solution N of nitre; after adding a few drops of acid, introduce it into a platinum capsule and boil it freely; then carefully pour

in a slight excess of standard solution. At this point of the process fill a graduated burette with the solution N, and add it, little by little, until the excess of barytic standard solution is exactly precipitated. This last operation is somewhat tedious and difficult, because the solutions do not readily become clear, and it is often necessary to filter small trial quantities. The relation between the total volume of N employed and the volume of barytic standard solution, gives the proportion of sulphate in a given weight of nitre.

Nitric acid is estimated in a very elegant manner, by using dry bichromate of potash, which expels nitric acid from the alkaline nitrates without decomposing the chlorides. The operation is thus conducted:—On a lump of saltpetre, melted and cooled, weighing from 2 to 5 grammes, and placed in a small but sufficiently large platinum crucible, place about twice its weight of previously melted and pulverised bichromate of potash. Weigh, and then carefully heat the whole. At first the reaction is somewhat energetic, and it frequently happens that considerable quantities of the mixture are carried off and are condensed on the inner surface of the cover, which should be shaped like a deep capsule, so that the fusible matter projected against it may fall in the crucible. In proportion as the nitrous vapors diminish, raise the temperature to a dull red heat, taking care to equalise the temperature of the cover by directing a gas jet on it. When the operation is finished, leave the crucible uncovered for a few instants, that the air in it may be renewed; allow it to cool, and weigh it. The loss of the weight indicates the quantity of nitric acid displaced, from which may be calculated the corresponding proportion of nitrate of potash or soda.

If the nitrate analysed contains at the same time potash and soda, an excess will be found by converting the estimated nitric acid into nitrate of potash; and, on the contrary, a deficiency, by converting the acid into nitrate of soda. This excess or deficiency allows of the calculation of the relative proportion of the two alkaline nitrates in the salt analysed.—*Chem. News, London, Aug. 3, 1861. from Ann. du Conservatoire des Arts et Metiers.*

ADULTERATION OF WAX WITH PARAFFIN.

Ludolt has met with a specimen of wax adulterated with paraffin. He detected the adulteration in the following way, (*Dingler's Polytech. Journal*, Bd. clx. s. 224): He heated a piece of the wax with an excess of fuming sulphuric acid. When the wax melted, a strong action took place, and when the evolution of vapor ceased the heat was continued a little longer, and then the mixture was allowed to cool. After cooling, the paraffin was found as a transparent layer upon the sulphuric acid. So much sulphuric acid must be used, that when the operation is ended the black residue may be fluid, otherwise it is difficult to separate the paraffin. Very small quantities of paraffin, the author says, may be discovered in this way. English sulphuric acid is not convenient for the purpose, as it decomposes the wax but slowly.—*London Chem. News*, Aug. 10, 1861.

OIL OF CAJEPUT.

Schmidt publishes *Trans. Royal Soc. Edin.*, vol. xxii., p. 360) some researches on cajeput oil. His analysis agrees with that of Blanchet and Sell— $C_{20}H_{16} + 2HO$ —but instead of the name *Dadyle*, given to it by these chemists, Schmidt proposes to call the oil the *Bihydrate of Cajeputene*. It boils at $175^{\circ}C$., becomes acid in the air, especially in the presence of alkalies; hydrochloric acid separates a resinous body. When heated to boiling, and some sulphuric acid is added gradually, the oil becomes colored, and between 170° and 175° a liquid distills having the composition $C_{20}H_{16} + HO$, which the author considers the *monohydrate of Cajeputene*. The vapor density of this body is 5.02, and corresponds to 4 volumes, which, as it contains an odd atom of oxygen, is an exceptional case. Repeatedly distilled with anhydrous phosphoric acid, this monohydrate forms a series of hydrocarbons of different degrees of volatility. The first *cajeputene* $C_{20}H_{16}$ boils between 160° and 165° , and is a colorless liquid, smelling like the hyacinth; it is insoluble in alcohol, but soluble in ether and oil of turpentine. Its sp. gr. at 15° is .850; vapor-density 4.717. Between 176° and 178°

isocajeputene passes; like the former it is insoluble in alcohol, but soluble in all proportions in ether and oil of turpentine.

Paracajeputene comes over about 316° ; it is a viscid fluid of a lemon-yellow color, slightly fluorescent; unlike the two former, it is insoluble in turpentine; in the air it soon changes to a red resin.

Iodine acts on these hydrocarbons when heated, and hydrogen is evolved. Bromine thickens cajeputene and isocajeputene, which are converted into a friable resin by a mixture of sulphuric and nitric acids. Hydrochloric acid colors all three violet, but does not form a definite compound with them. When, however, oil of cajeput is shaken with hydrochloric acid an unstable compound $C_{20}H_{16} + 2HCl$ is formed, which heated to 160° parts with one equivalent of the acid.

Bichloride of cajeputene is formed when a current of chlorine is passed through a solution of cajeputene in nitric acid. It is a heavy crystallizable oil with an agreeable smell; it decomposes on distillation, and detonates with nitrate of silver.

The author has also obtained a bromide, $C_{20}H_{16} + 4Br$. and a hydriodate, $C_{20}H_{16} + HI$.—*London Chem. News*, Aug. 31, 1861.

PRODUCTION OF VALUABLE MANURE FROM THE AIR.

By MM. MARGUERITTE and DE SOURDEVAL.

The value of guano and most other concentrated manures consists to a considerable extent of the ammonia which they contain. As three-quarters of the atmospheric air consists of nitrogen, and as hydrogen forms one-ninth of all pure water, if some cheap means could be found for inducing the hydrogen of water to enter into combination with the nitrogen of the air in the form of ammonia, this valuable manure could be produced in unlimited quantities, and the agricultural products of the world enormously increased. The efforts to do this have been, at last, crowned with success, as will be seen by the following abstract of some recent continental researches.

Since the remarkable labors of Messrs. Liebig, Schaltenmann, and Kuhlmann, on the fertilizing action of ammoniacal salts, the production of ammonia at a low price has become a problem

of the highest interest to agriculture. But to arrive at this result it is necessary to obtain the nitrogen elsewhere than in nitrogenous matters; which may, for the most part, be employed directly as manures, and of which the limited quantities and elevated price permits in any event only restricted and costly manufacture.

Atmospheric air is an inexhaustible and gratuitous source of nitrogen. However, this element presents so great an indifference in its chemical reactions, that, notwithstanding the numerous attempts which have been made, chemists have not heretofore succeeded in combining it with hydrogen so as to produce ammonia, artificially. This result, so long desired, has been reserved for MM. Margueritte and De Sourdeval, who have obtained it by employing an agent of which the remarkable properties and neat and precise reactions have permitted them to succeed where all others have failed. This agent is baryta, of which notice has recently been taken on account of the recent applications that M. Kuhlmann has made of it in painting, but of which no person suspected the part that it was to be called to play in the development of the agricultural riches of our country. The manufacture of ammonia is based on a fact entirely new, the cyanuration of barium. It had been believed until the present time that potash and soda alone had the property of determining the formation of cyanogen; that the earthy alkaline bases—baryta, for example, could not, in any case, form cyanides.

Messrs. Margueritte and De Sourdeval have ascertained that this opinion is entirely erroneous, and that baryta, much better than potash or soda, fixes the nitrogen of the air or of animal matters in considerable proportions. It is already understood that, for the preparation of Prussian blue, the cyanide of barium presents great advantages over that of potassium, for the equivalent of baryta costs only about the one-seventh of that of potash. Thus do we find practically and really obtained the result first announced by Desfosses and vainly pursued in France and England, the manufacture of cyanides from the nitrogen of the atmospheric air. This solution, so important, depends on the essential difference which exists between the properties of baryta and those of potash; the first is infusible, fixed, porous, and

becomes deeply cyanuretted without loss; the second is fusible, volatile, and becomes cyanuretted only at the surface, and suffers by volatilization a loss which amounts to 50 per cent. After the cyanide of barium was obtained, the grand problem for Messrs. Margueritte and De Sourdeval to resolve was the transformation of the cyanide into ammonia by means at the same time simple, rapid and inexpensive. The following is the operation :

In an earthen retort is calcined, at an elevated and sustained temperature, a mixture of carbonate of baryta, iron filings in the proportion of about 30 per cent., the refuse of coal tar, and saw-dust. This produces a reduction to the state of anhydrous baryta, of the greater part of the carbonate employed. Afterwards is slowly passed a current of air across the porous mass, the oxygen of which is converted into carbonic oxide by its passage over a column of incandescent charcoal, while its nitrogen, in presence of the charcoal and of the barium, transforms itself into cyanogen and produces considerable quantities of cyanide. In effect, the matter sheltered from the air and cooled, and washed with boiling water, gives with the salts of iron an abundant precipitate of Prussian blue. The mixture thus calcined and cyanuretted is received into a cylinder of either cast or wrought iron, which serves both as an extinguisher and as an apparatus for the transformation of the cyanuret. Through this cylinder, at a temperature less than 300° (Centigrade) is passed a current of steam, which disengages, under the form of ammonia, all the nitrogen contained in the cyanide of barium. It is impossible to foresee all the results of this great discovery. Among other things, it suggests the production of nitric acid from the air by oxidizing ammonia.—*London Chem. News*, No. 46.

HABITS OF THE CUTTLE FISH.

Those who are familiar with the poulpes and cuttles of our coasts will readily allow that there is something more than usually repulsive in their appearance. Their flabby, corpse-like fleshiness, now lax and soft, now plumping up, their changes of color, the livid hue that comes and goes so strangely, the long

lithe arms with their cold adhesive powers, their uncouth agility, their cunning adroitness and intelligence, and especially the look of their ghastly green eyes, make them decidedly "no canny." It does not need that they should be sufficiently colossal in dimensions to throw their arms over a ship's hull and drag her under water, as Oriental tales pretend, and as old-fashioned naturalists believed, to induce us to give to them a wide berth. It would not be pleasant to be entwined in the embrace of those arms; and we can sympathize with Mr. Beale, who has described his feelings during an encounter which he had with a beastie of this sort, while engaged in searching for shells among the rocks of the Bonin Islands. He was much astonished at seeing at his feet a most extraordinary looking animal, crawling towards the surf, which it had only just left. It was creeping on its eight legs, which, from their soft and flexible nature, bent considerably under the weight of its body, so that it was lifted by the efforts of its tentacula only a small distance from the rocks. It appeared much alarmed at seeing him, and made every effort to escape. Mr. Beale endeavored to stop it by pressing on one of its legs with his foot; but although he used considerable force for that purpose, its strength was so great that it several times liberated its member, in spite of all the efforts he could employ on the wet and slippery rocks. He then laid hold of one of the tentacles with his hand, and held it firmly, so that it appeared as if the limb would be torn asunder by the united efforts of himself and the creature. He then gave it a powerful jerk, wishing to disentangle it from the rocks to which it clung so forcibly by its suckers. This effort it effectually resisted; but, the moment after, the apparently enraged animal lifted its head, with its large projecting eyes, and, loosing its hold of the rocks, suddenly sprang upon Mr. Beale's arm (which he had previously bared to the shoulder for the purpose of thrusting it into holes in the rocks after shells) and clung to it by means of its suckers with great power, endeavoring to get its beak, which could now be seen between the roots of its arms, in a position to bite. A sensation of horror pervaded his whole frame, when he found that this monstrous animal had fixed itself so firmly on his arm. He describes its cold, slimy grasp as extremely sickening; and he loudly called to the

captain, who was similarly engaged at some distance, to come and release him of his disgusting assailant. The captain quickly came, and taking him down to the boat, during which time Mr. Beale was employed in keeping the beak of the Octopus away from his hand, soon released him by destroying his tormentor with the boat-knife, when he disengaged it by portions at a time. This Cephalopod measured across its expanded arms about four feet, while its body was not larger than a man's fist.—*London Pharm. Journ.*, from *Gosse's Romance of Natural History*.

ON THE USE OF PHENIC ACID FOR DISINFECTING PURPOSES, AND ITS MODE OF ACTION.

BY M. J. LEMAIRE.

Since MM. Corne and Demeaux's paper on "Coal-tar" was presented to the Academy, M. Dumas has stated that the disinfecting properties of this body are due to phenic acid. M. Lemaire's experiments prove this opinion correct. He has witnessed the efficacy of phenic acid dissolved or made into emulsion in the preservation of animal matters. Phenic acid made into an emulsion and injected into the bodies of animals will preserve them unaltered in contact with the air; a human adult body can be preserved with less than 50 centimes.

The author has already indicated an important application of phenic acid to the destruction of parasites. An aqueous solution of one per cent. of this acid, and 40 per cent. of acetic acid, removes tinea in 30 or 40 days, and cures itch speedily. Acetic acid is added to the preparation, to enable the medicament to penetrate the epidermis, so as to reach the bulbs of the hair. I am of opinion that the same solution would serve to destroy domestic insects; the powders used for this purpose are effective, but the solution would penetrate better into the crevices of furniture.—*London Chem. News*, Aug. 3, 1861.

OBSERVATIONS ON THE ETUA-TREE (KIGLIA AFRICANA.)

The tree called by the Fantees "Etua" is found growing in several districts of the Gold Coast. It attains a height of eighteen feet or more. The fruit, which is, in its transverse

section, of an oblate shape, hangs from the tree by a rounded cord-like stem, sixteen and a half inches long. The length of the fruit is sixteen and a half inches; circumference, in the centre eleven inches, and at the upper and lower ends ten and a half inches; while the diameter is three inches and three-fourths. A tough greenish-brown rind, with dark spots, encloses the pulp, which closely adheres to the cortex. A vertical section shows that the closely-grained nearly dried fleshy fruit is of a reddish-brown color, the seeds being imbedded in a fibrous and tenacious substance. In taste and flavor the fruit is strongly, but not unpleasantly, astringent; the rind less so; but the bark of the tree is strongly astringent; and I feel satisfied that the bark of the Etua-tree will be found a medicine of great value in the treatment of diarrhœa and dysentery. The negroes esteem it as a sovereign cure for dysentery, and have done so for countless ages. On the Gold Coast the fruit is fetish, and is employed by the wily fetish men and women as a charm. When it is so used, the fresh fruit is painted in alternate stripes of red, white and black. The colors are composed of ochre, chalk and charcoal. Thus prepared, the fruit is transfixed to the earth, either in the pathways, house, or about the house of the party who consults the fetish man or woman, as may be directed. Sometimes the fruit is painted entirely black, and then dotted all over with red and white spots, when it is used in a similar manner. The ceremony is an invocation to the fetish to discover the remedy which is suitable to cure the disease of the person seeking advice from the fetish man or woman.—*London Pharm. Journ.*, from *Remarks on the Topography and Diseases of the Gold Coast. Read before the Epidemiological Society, by R. Clarke, Esq., Colonial Surgeon, Gold Coast.*

ON THE MODE OF DISSECTING [OR SKELETONIZING] LEAVES.

Several correspondents having applied to us for information as to the best mode of dissecting leaves, &c., we subjoin the following particulars, which a correspondent has kindly forwarded to us: Steep the leaves, seed-vessels, or other parts of the plant, which are required to be dissected, in rain water;

leave them exposed to its influence until the whole of the soft or pulpy matters are decomposed. The period required for this operation varies much in different leaves, &c., according to their texture; thus, some require but a few weeks, others as many months. When the pulpy parts are completely decomposed, the next operation consists in their removal from the fibro-vascular net-work with which they were originally connected. This requires much care and patience. There are two ways of accomplishing it; one, which consists in carefully exposing them to a stream of fresh water, using at the same time a brush; and the other by simply placing them in fresh water, and removing with care the decomposed portion, in like manner, with a brush. Some difficulty will be found at first in doing this without, at the same time, breaking the fibro-vascular net-work; but a little practice will soon render it easy of accomplishment. The adoption successively of simply fresh water, and a stream of the same, applied by means of a syringe, will be frequently found desirable. The pulpy portions having been removed, and the fibro-vascular net-work obtained, the latter must be then bleached. For this purpose, prepare a weak solution of chloride of lime, by adding about an ounce of a strong solution of that substance to a quart of distilled water; then soak the skeletons in this solution for some hours; generally three or four will suffice, but when they are very thick a longer period will be necessary. After this operation has been performed, wash the skeletons thoroughly in pure water, and, lastly, dry them by freely exposing them to light and air.—*London Pharm. Journ.*

WORKING IN ALUMINUM.

We extract the following valuable article from the *Ironmonger*. The information is obtained from Messrs. Bell and Brothers, Newcastle-on-Tyne, manufacturers of aluminum.

The peculiar properties of this substance having been so little understood, has hitherto hindered its general employment, but now that it is sold in a pure state at as low a rate as 50s. per pound avoirdupois, it is likely to be much more frequently used.

Aluminum is a metal of fine white color, slightly inclining to blue, especially after being well hammered when cold.

Aluminum, like silver, is susceptible of a very fine "matting," which is not affected by exposure to the air, or by any of the impurities usually present in the atmosphere of towns. To obtain this matting, the aluminum objects (being previously washed in benzole or essence of turpentine) must be plunged into a weak solution of caustic soda, thoroughly well washed, and exposed to the action of strong nitric acid. When the desired matting has been obtained, it must be well washed again, and dried in sawdust.

Aluminum is easily polished or burnished. To do this, it is necessary to use a mixture of equal parts of rum and olive oil, as an intermediate substance between it and the polishing stone or powder used. The polishing stone is steeped in this mixture, and will then burnish aluminum in the same manner as gold and silver is burnished, care being taken not to press too heavily upon the burnishing instrument.

Aluminum can be beaten out, either hot or cold, to the same extent and as perfectly as gold or silver; and it is susceptible of being rolled in much the same way as either of the above metals. Leaves as thin as those used for gilding and silvering can be made of aluminum. Covered ingot moulds of iron answer best for receiving aluminum intended to be used in the rolling mill. Aluminum quickly loses its temper, and therefore requires frequent reheating. The temperature of this reheating is a dull red heat, and when the plates become very thin, this demands the greatest attention.

Aluminum is easily drawn into wire. For this, the ingots are run into an open mould, so as to form a kind of quadrangular shape of a little less than half-an-inch section, which is then beaten upon the edges by the hammer very regularly; the operation of drawing out is then commenced on a horizontal bench, by very gradually reducing the diameter of the metal intended to be drawn into wire, and by frequent reheating, and then the ordinary process of wire-drawing can be proceeded with. When the threads are required extremely fine—as, for example, for the manufacture of lace—the heating becomes a very delicate operation, on account of the fineness of the threads and the fusibility of the metal. The heat of the current of air issuing from

the top of the glass chimney of an Argand lamp will suffice for the heating.

The elasticity of aluminum is very much the same as that of silver, and its tenacity also about the same. The moment after it has been melted, aluminum possesses about the hardness of pure silver; when it is hammered out, it almost resembles that of soft iron; it becomes elastic, acquiring, at the same time, considerable rigidity, and emits the sound of steel when suffered to fall on a hard body.

A property which aluminum manifests in a high degree is that of excessive sonorousness. This property has already rendered it of service in the construction of several musical instruments.

Aluminum is much lighter than ordinary metals. Its density is 2.56, a quarter that of silver, and about a third that of iron. By the action of the hammer, the density of aluminum increases sensibly, so as to become equal to 2.67.

Aluminum melts at a higher temperature than zinc, and a lower one than silver; to melt it, an ordinary earthenware crucible must be employed, without the addition of any sort of flux.

Its low point of fusion, along with its slowness of heating, require that for melting it a less intense fire should be used, but applied for a longer time than in melting silver.

It is easily melted in an open crucible, which facilitates the removal of the dust and other impurities which appear on the surface of the metal; and for the purpose of stirring the entire mass, a clean iron spatula is used.

Aluminum is easily run into metallic moulds; and, still better, for objects of a complicated form, into moulds of dry porous sand, formed so as to allow an easy passage for the air expelled by the metal, which is viscous when melted. It ought to contain a greater number of passage holes, and should be so managed as to run it in one long and perfectly cylindrical git. When heated to a red heat, it ought to be poured out with tolerable rapidity. A small portion of the fused metal should be caused to run into the git itself when full, to compensate for the contraction of the substance of the metal at the moment of solidification.

By following all these precautions, castings of the highest degree of fineness may be obtained; but, at the same time, to suc-

ceed perfectly, an especial acquaintance with the subject is needed.

In the production of work where the use of the lathe becomes necessary, any scratching or tearing of the metal by the tool is avoided by covering the surface to which the tool is applied with a varnish composed of stearic acid and essence of turpentine.

When aluminum is soiled by greasy matters, it can be cleaned by benzole; if it be soiled by dust only, india-rubber, or very weak soap and water may be used.

The pieces of aluminum intended to be soldered must be prepared in the same manner as objects are treated for soldering with tin, viz., by a "tinning;" but it must be remembered that it is indispensable that this tinning must take place with the solder itself. The pieces to be soldered, thus tinned beforehand, are afterwards joined together, and exposed to the flame, either of a gas blowpipe, or any of the ordinary sources of heat used in such cases. In order to unite the solderings, small tools of aluminum are used. These tools are used as little soldering instruments, and they facilitate at the same time the fusion of the solder, and its adhesion to the previously prepared aluminum.

The use of tools of copper or brass used when soldering gold and silver, must be strictly avoided, as they would form colored alloys with the aluminum and the solder. It is of the greatest importance never to use any flux to cause the solder to melt, as all those at present known attack aluminum, and prevent the adhesion of the pieces to be soldered. The use of the little tools of aluminum is an art which the workmen must acquire by practice; in fact, at the moment of fusion the solderings must have the friction applied, as they melt suddenly in a complete manner. In soldering aluminum, it is well to have both hands free, and to use only the foot for the blowing apparatus.

Solders of different compositions and degrees of fusibility have been employed in soldering aluminum. The following are those which have been generally used, ranged according to their order of fusibility:

	I.	II.	III.	IV.	V.
Zinc	80	85	88	90	94
Copper	8	6	5	4	2
Aluminum . . .	12	9	7	6	4

No. 4 is the one usually preferred, particularly for soldering smaller objects.

In order to make the solder, the copper is first melted, the necessary aluminum is added, and stirred by means of an iron spatula, unpolished, as it comes from the blacksmith, adding also a little tallow; the zinc is then added, avoiding too much heat, as this last metal is easily oxidized, and is very volatile. —*Chemical News, London, August, 1861.*

ARSENIOUS ACID IN LARGE DOSES: A SUBSTITUTE FOR QUININE.

BY J. TURNER,

Surgeon to H. M. Brigade, Bombay Horse Artillery.

(Communicated to the Royal Medical and Chirurgical Society.)

The author has employed arsenious acid for twenty years in the treatment of intermittent fevers, and on account of the great drain upon the cinchona tree, its failure in India, and his strong opinion as to the equal if not greater value of arsenious acid in the above-named diseases, he now brings the results of his experience before the profession. He considers the fears of an inconvenience or danger arising from the remedy as much exaggerated, and instances the case of a child of nine months, to whom he gave twenty minims of the arsenite of potash* within ten hours, repeating the dose on the following day, with the only effect of curing an obstinate quotidian intermittent. Mr. Turner's success was so marked, that in 1860 the Director General stated that Mr. Turner should be thanked for "drawing attention to his successful treatment of intermittent fevers by large doses of arsenic, and steps should be taken by circular to urge an extended trial of this remedy, and reports requested." The course usually adopted by the author was to give the arsenite of potash as in the following prescription: Arsenite of potash and compound tincture of cardamoms, of each half a drachm; gum mucilage, three drachms; camphor mixture or water, half an ounce; mix. To be given every second hour four or five times, the last to anticipate the expected paroxysm at least two hours.—*London Pharm. Journ.*

* Of course *liquor potassæ arsenitis* is intended.—*Ed. Pharm. Journ.*

NORWEGIAN CASTOR.

At a meeting of the Medical Society of Christiana, M. Ditten, Pharmacien, exhibited two sacs of fresh Castor, each of which weighed 125 grammes. He had bought them of a Norwegian peasant, who had six others in his possession, and who told him that he frequently took *Castors* in the environs of the village in which he lived.

Professor Holst observed on this occasion, that the interior cavity, which had long been considered as the distinctive character of the Siberian Castor, to which Norwegian Castor must be connected, was wanting in the two sacs presented by M. Ditten; but it had been recently shown that the formation of this cavity depended upon the mode in which Castor was dried. The smell and taste peculiar to Siberian Castor alone constitute its certain characteristics. When the Siberian Castor has attained its full development, and when taken in one of the first months of the year, a pair of sacs will weigh 375 grammes. The Castor thrives best in desert and wild countries; the increase of population and the extension given in Norway to agriculture will render the Castor more and more rare in that country.—*London Pharm. Journ.*, from *Archiv fur Pharm. og Technisch. Chem.*, and *Journal de Chimie Médicale*.

ON THE COMPOSITION AND PROPERTIES OF PERMANGANIC ACID.

By M. H. ASCHOFF.

Mr. Phipson's assertions relative to the non-existence of permanganic acid, already refuted by M. Machuca, are further contradicted by those of M. Aschoff. Having occasion to occupy himself with these inquiries, M. Aschoff has entirely confirmed M. Mitscherlich's long-known views relative to the composition of permanganate of potash. He also proved that violet permanganate becomes changed to green manganate with disengagement of one atom of oxygen, and that the green solution again becomes violet by the action of carbonic acid with a deposit of peroxide of manganese, according to the equation $3(\text{KO}, \text{MnO}_3) + 2\text{CO} = \text{KO}, \text{Mn}_2\text{O}_7 + \text{MnO}_2 + 2(\text{KO}, \text{CO}_2)$.

The author afterwards occupied himself with preparing anhydrous permanganic acid. He finds that this preparation can be made without danger, even when operating with 20 grammes of permanganate, by taking care to cool the sulphuric acid (1.845 density) with a refrigerating mixture, and by gradually introducing the permanganate, which must be free from all chloretted combinations.

The dissolved permanganic acid colors the acid dark green, forming at the same time some oily drops, which fall to the bottom of the vessel, and which, after a time, or rather when the mixture is heated, disengage oxygen. Manganate of potash behaves in an analogous way. There is always a deposit of peroxide of manganese, the manganic acid immediately decomposing into peroxide and permanganic acid.

Permanganic acid forms a dark brown-red liquid, fluid at 20° , very unstable, attracting humidity and decomposing with disengagement of oxygen. It gives no trace of vapor in an exhausted receiver, and when heated to above 65° it detonates violently with flame, and is transformed into sesquioxide of manganese. Its composition answers exactly to the formula Mn_2O_7 .

When permanganates or manganates contain chlorides the phenomena are different, and the yellow vapors obtained by M. Dumas are produced by adding sea salt to a mixture of permanganate of potash and sulphuric acid.

M. Aschoff has not succeeded in condensing a sufficient quantity of these vapors for analysis; but he has collected and studied some small drops analogous to anhydrous permanganic acid, which are also isolated in this experiment, and the composition of which answers to the formula of Mn_2ClO_6 . This body may be a new combination or a mixture of anhydrous permanganic acid and a chloretted combination of manganese.—*London Chem. News*, Aug. 24, 1861.

THE PRODUCTION OF ALIZARIN FROM NAPHTHALIN.

M. Z. Roussin has communicated to the French Academy a process for the conversion of naphthalin into alizarin. This result, if really practicable, will prove of considerable importance.

Naphthalin is produced in large quantities in the manufacture of gas, and has hitherto been nothing more than a waste product; its conversion, therefore into so valuable an agent as alizarin, will form an important addition to the list of discoveries which have recently added so much to the resources of the dyer.

That some connection exists between the alizarin and the naphthalic series of bodies, has been recognized by chemists, and the probability of the conversion, has we believe, tempted more than one experimenter.

M. Roussin's process consists in making a mixture of binitro-naphthalin and concentrated sulphuric acid in a large porcelain dish heated by a sand bath. As the temperature rises, the binitro-naphthalin dissolves completely in the acid, forming an amber colored solution. When the mixture is at 200° Cent. some finely granulated zinc is added. In a few instants an evolution of sulphurous acid takes place, and in half an hour the operation is completed. If a drop or two of the acid liquid be now thrown into cold water, a deep red violet color is developed, owing to the formation of alizarin. It is important in operating upon any large quantity of materials, to add the zinc in small successive portions, and to take care that the temperature of the acid liquid does not exceed the point indicated, as otherwise the reaction becomes excessively violent, and the proportion of alizarin is diminished.

The liquid resulting from the above reaction, is diluted with eight or ten times its volume of water, boiled for a few minutes, and then thrown on a filter. On cooling, the alizarin is deposited in the form of a red jelly, which, when examined under the microscope, is seen to consist of distinct needle-like crystals. The mother liquor has a deep red color, and contains a considerable quantity of alizarin in solution. When diluted with water and properly neutralized, it can be used directly for dyeing purposes. It contains a large amount of sulphate of ammonia in solution.

In this process the zinc may be replaced by tin, iron, sulphur, carbon, and other bodies of a like nature.

We may represent the reaction which takes place by abstracting from the binitro-naphthalin ($C_{20}H_6(N_2O_8)$), two atoms of nitrogen and two of oxygen, when the formula of alizarin ($C_{20}H_6O_6$) is obtained. The N_2O_2 so removed, by taking eight atoms of

the hydrogen resulting from the action of the zinc on the sulphuric acid, becomes two atoms of ammonia ($N H_4 O$), which is found as sulphate of ammonia in the mother liquor. Some sulphurous acid is, however, evolved during the experiment.

The author gives the following method for preparing the binitro-naphthalin used in this process. Three to four parts of mono-hydrated nitric acid (sp. gr. 1.5) are placed under a chimney with a good draught, and one part of naphthalin gradually and cautiously added in small quantities at a time, keeping the liquid constantly stirred. Each addition of the naphthalin causes a noise like the immersion of heated iron into water. On cooling, the liquid sets into a crystalline mass, which is drained, then washed to remove the acid, and dried. It constitutes the binitro-naphthalin almost completely pure.

M. Roussin states that the alizarin obtained by his process possesses all the characteristics and reactions of ordinary madder-alizarin. It is almost insoluble in water, soluble in alcohol and ether. It volatilizes between 215° and 240° C., yielding a yellow vapor, which deposits red needle-like crystals. It dissolves in alkalis with the characteristic color, and is precipitated by acids. Like madder-alizarin, it furnishes most beautiful lakes, and dyes the same pure tints. The elementary analysis of this artificial alizarin, however, has not yet been made.

The author has also described some other reactions of binitro-naphthalin, by which colored products are obtained. By treating it with a protosalt of tin dissolved in caustic alkali, and heating the mixture in a water-bath, a precipitate is obtained, which when well washed is of a violet blue color, and dissolves in alcohol, furnishing a deep violet solution which dyes perfectly.

A concentrated and boiling solution of cyanide of potassium also acts energetically upon binitro-naphthalin. The liquid becomes reddish brown. When cold, the precipitate is well washed. It dissolves in boiling water and alcohol, yielding a deep blue solution.—*London Pharm. Journ.* July, 1861.

(Continued from page 472.)

Another method, which in many cases is easy of execution, depends on the behaviour of many bodies to alumina. The hydrochloric acid of the fluid is precipitated completely with the solution of sulphate of silver; the fluid, now containing sulphuric acid, is mixed with the hydrate of alumina in a moist condition, and ammonia is added to the solution. If a precipitate results which contains the decomposition product obtained with sugar while the sugar and sulphate of ammonia and a little free ammonia remains dissolved in the fluid, this solution is evaporated, and the residue, when it has acquired a syrupy consistence, is mixed with anhydrous alcohol. The sulphate of ammonia remains undissolved, whilst the sugar is taken up by the alcohol containing a little water, and after evaporation remains behind.

If a volatile decomposition product results by the treatment of the crystals with dilute hydrochloric acid in the heat, this is contained in the receiver which was connected with the flask by means of a refrigeratory apparatus, wherein the boiling with the acidulated water took place. A small portion of the fluid is mixed with carbonate of soda as long as effervescence results with this salt, and is then distilled. If the distillate is pure water, the decomposition product is an acid. On the contrary, if the decomposition product is not an acid, it passes over by distillation, while the hydrochloric acid remains in the residue as common salt. When an acid has been obtained, to obtain it free from hydrochloric acid the distillate is mixed with sulphate of silver as long as chloride of silver is thereby precipitated. The chloride of silver is removed by filtration, and the fluid containing sulphuric acid is distilled, by which the acid distils over with pure water.

When we have determined by the above described examination whether the substance under investigation by the action of hydrochloric acid* is decomposed or not into sugar and a second product at an elevated temperature, we have still to ascertain *whether by action of an alkali in the heat an analogous decomposition* is effected or not. Many bodies afford, by the treatment with baryta, a carbhydrate, and the same decomposition product which is obtained by treatment with hydrochloric acid. The tannin of galls affords gallic acid as well by the treatment with hydrochloric acid as with baryta water. Others behave in this respect differently. Æsculine gives, when heated with hydrochloric acid, æsculetine; on the contrary, by treatment with baryta water, no trace of æsculetine is obtained. With reference to the carbhydrates, the copulated substances behave likewise similar and dissimilar. The tannin of galls treated with

* The hydrochloric may in these investigations be replaced by sulphuric acid with but few exceptions; the latter can be more readily removed when the decomposition has been completed. But in general the decomposition proceeds more slowly and less completely, and often not at all, with sulphuric acid than with hydrochloric acid.

hydrochloric acid gives crystallized grape sugar; on the contrary, by treatment with baryta water, a carbohydrate with the decided character of an acid. The thujine from the green parts of *Thuja occidentalis* treated with hydrochloric acid affords a non-crystallizable carbohydrate; on the contrary, by treatment with baryta water, crystallized grape sugar. Independently of this difference, a number of substances still exists which, by treatment with baryta, do not set free a carbohydrate, as is the case by the action of hydrochloric acid, but an acid results which combines with the baryta, while a substance is formed which, by the action of acids, affords sugar and a second decomposition product. Thus populine, by treatment with baryta, gives, besides benzoate of baryta, salicine, and ononine, besides formiate of baryta affords formonetine. Salicine as well as formonetine are copulated sugar compounds.

It will be seen from the examples cited that the behaviour of a substance of that kind to hydrochloric acid renders in no way superfluous the study of its relations to an alkali.

In consequence of the facility with which organic substances oxydize in contact with an alkali in the oxygen of the air, it is necessary to undertake the treatment with baryta *in an atmosphere of hydrogen*. To accomplish this, an aqueous solution of the substance under examination, as concentrated as possible, is introduced into a flask which is closed with a cork having three perforations. Through one perforation a glass tube passes which is bent at an angle, and serves to connect the flask with a refrigeratory apparatus, and a receiver for the collection of the volatile decomposition products evolved. Through the second perforation, a glass tube bent at a right angle passes almost to the bottom of the flask, through which the hydrogen enters into the flask to drive out the air. The hydrogen is generated from granulated zinc and water by sulphuric acid, and first conducted through a washing bottle containing a solution of bichloride of mercury for the separation of the sulphuretted and arseniuretted hydrogen before it passes into the fluid. Through the third perforation the long beak of a funnel is stuck, which can be rendered air tight by a glass rod ground in above where the beak of the funnel begins. This funnel is filled, when all the air is displaced by hydrogen, with a concentrated hot solution of the hydrate of baryta in water. By raising the glass rod the baryta is allowed to flow into the flask, which is closed before the last drops have run in.* The baryta water may be thus introduced into the flask without a trace of air coming in contact with the contents of the flask. Often an insoluble compound of baryta with the organic substance results, so that a dense precipitate is formed. In this case the flask, which is heated on a sand-bath, must be frequently shaken, to prevent a deposition of the precipitate. Gener-

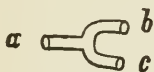
* When the hydrogen gas is evolved from a flask, the necessary mixture of sulphuric acid and water for the continued development of the gas must be passed in through a funnel constructed in the same manner to prevent the ingress of the air into the bottle.

ally, the decomposition proceeds more rapidly with baryta than with hydrochloric acid. Upon the termination of the decomposition the flask is allowed to cool, in a continuous current of hydrogen. Either a clear solution results, consequently no insoluble baryta compound has been formed, or such is suspended in, or deposited at the bottom of, the fluid. Instead of hydrogen gas, either *carbonic acid gas* is conducted into the flask, or *dilute sulphuric acid* is poured in through the funnel which is capable of being closed. Both operations are intended to convert the excess of baryta into a carbonate or a sulphate. By the sulphuric acid always, and sometimes by the carbonic acid, the baryta compound of the decomposition product formed is decomposed. Whether carbonic acid or sulphuric acid should be used must be ascertained by an experiment which is made with a small portion of the contents of the flask. In this preliminary experiment carbonic acid is employed, and it is observed whether by filtering the fluid in contact with the air it undergoes a change. If no change happens, carbonic acid should be conducted through the fluid in a large quantity. On the contrary, if it changes in the air, the bulk of the fluid must be treated with sulphuric acid. Some substances are oxidized in contact with carbonate of baryta, but others are not. Some compounds which result by treatment of the substances with baryta water are almost quite insoluble in water when an excess of baryta is present, and as this separates by the carbonic acid they dissolve, or from the compounds formed with baryta, compounds poor in baryta are produced which are soluble in water, whilst those rich in baryta are insoluble. In such cases it is more advantageous to add alcohol to the contents of the flask, and to filter the whole. The carbohydrate, or its compound with baryta, is dissolved in the spirituous fluid, and the baryta salt of the second decomposition product remains on the filter. The mass changes on the filter when a readily oxidizable substance is contained in it. The carbohydrate is obtained in the solution, and may be obtained pure by distilling off the spirit and carefully precipitating the baryta by sulphuric acid and then evaporating the fluid free from baryta.

As it is desirable by treatment with baryta to test portions of the material, whether treated with carbonic acid or sulphuric acid, or mixed with alcohol, without bringing the whole mass of the fluid into contact with the air, I will here describe a method by which portions can be used for the preliminary investigation without bringing the entire quantity of the fluid from which these portions are taken into contact with the air. For this purpose, the end of the glass tube is closed through which the hydrogen gas and the aqueous vapor pass out, and the glass rod is loosened by which the funnel serving for the conveyance of the baryta water into the flask is closed. By the pressure which the gas and vapor exercise on the surface of the fluid in the flask, the fluid rises up through the beak of the funnel, and fills the funnel more and more after the glass rod is withdrawn.

When sufficient fluid has been forced in this way into the funnel, this is closed with the glass rod, and the glass tube opened. The portion of the fluid in the funnel required for examination may be removed by means of a pipette.

I must also mention a small arrangement which renders easy the displacement of the hydrogen gas by the carbonic acid gas, without permitting the entrance of air into the apparatus. This arrangement consists of a



spur made of vulcanized caoutchouc. This forked tube at *a* is to be connected with the glass tube, bent at a right angle, which conducts the hydrogen gas into the flask. The forked tube is attached at *b* to the apparatus for evolving hydrogen, and is at *c*, connected with a gasometer containing carbonic acid. While the tube at *b* is closed with a clamp, carbonic acid is allowed to stream out of the gasometer until all the air is driven out of the conducting tube. The carbonic acid passes at *a* freely, as the tube at *b* is closed by a cock. The tube at *c* is now shut with a clamp, and the cock of the gasometer is also closed. Then *a* is attached to the tube in the flask, and *b* with the hydrogen gas apparatus, and the air expelled from the flask by the hydrogen gas. After the baryta has acted sufficiently long, and it is wished to conduct carbonic acid into the flask, the tube is closed at *b*, which in the mean while was open, and the tube is opened at *c*, and carbonic acid allowed to pass in from the gasometer.

When a clear fluid is obtained by the treatment with baryta, it is ascertained whether, by the addition of alcohol, a baryta compound is precipitated, while the carbohydrate remains dissolved in the spirituous fluid. Often in this way a separation can be accomplished.

If a separation is not effected in this way, *carbonic acid* is conducted into the fluid until all excess of baryta is saturated with carbonic acid. In many cases the baryta compound of the decomposition product is thereby decomposed. The contents of the flask are heated now to the boiling point, while hydrogen gas instead of carbonic acid is passed through the fluid. By boiling, the dissolved bi-carbonate of baryta is converted into the carbonate. The contents of the flask are then filtered. On the filter, carbonate of baryta and a decomposition product remain when the latter is insoluble in water, and was dissolved only as a baryta salt in the water. The carbohydrate is contained in the fluid frequently as a baryta compound (consequently not precipitated from the baryta by carbonic acid), either alone or together with the second decomposition product, which may be dissolved either free from baryta or as a baryta salt. When the substance, as ononine or populine, &c., is decomposed by baryta into a baryta salt and a copulated carbohydrate, a copulated carbohydrate and not a separated carbohydrate is obtained in the filtrate. On this account, we have always to ascertain whether a carbohydrate, or such a copulated compound, is obtained by the

treatment with baryta in the heat. If, by heating with baryta, instead of a clear solution a solid compound is obtained, which is suspended in the fluid or is deposited therein, it is separated generally, as above described by filtration from the fluid after the addition of alcohol. When the contents of the flask have been treated with an excess of *sulphuric acid* instead of carbonic acid, and then filtered, sulphate of baryta is found on the filter, and sometimes a decomposition product, insoluble in water, mixed with the sulphate of baryta, and in the filtrate a little free sulphuric acid, and either both or one of the decomposition products dissolved therein. By the careful addition of baryta water the sulphuric acid is separated. The fluid freed from sulphuric acid is heated in a distillatory vessel, and the distillate examined for a volatile acid, perchance resulting from the decomposition of the original substance. The residue of the distillation is further examined by mixing a portion thereof with perchloride of tin, sugar of lead, subacetate of lead, and baryta water. It generally happens that one of the decomposition products is thrown down in the form of an insoluble compound by one of these precipitants, while the other decomposition product remains in solution. The excess of tin or lead salt is removed by sulphuretted hydrogen, and the excess of baryta by sulphuric acid. With perchloride of tin, after the removal of the sulphuret of tin and expulsion of the sulphuretted hydrogen, the hydrochloric acid is to be separated by suitable means.

In individual cases, by the *application of caustic soda or potash* in the place of the hydrate of baryta, perfect solutions are obtained, from which the potash or soda compound of one decomposition product is separated in an insoluble form after the substance under examination has split up. In such cases it is naturally advantageous to employ soda or potash instead of baryta. Generally, the potash or soda compounds separated are insoluble only in potash or soda solutions, but not in pure water. Consequently the washing must be performed with these solutions. The filtered solution is carefully saturated with sulphuric acid, evaporated, and the second decomposition product removed by alcohol from the alkaline sulphates, which are insoluble in that menstruum.

From the results which are obtained by the described investigation it may be determined whether by the treatment with acids or baryta the substance remains unchanged or not, or whether it is split up into two or more products. *But the case is possible that after the treatment with acids or alkalies, no two decomposition products can be discovered, although the original substance no longer exists.* In this case, where only one substance results in the place of another by the action of acids or alkalies, the original substance is converted into a new body, manifestly under the reception of the elements of water, or the expulsion of oxygen and hydrogen in equal equivalents that is under the separation of water. The substance under examination, therefore, does not belong to the class of copulated compounds.

When the methods of examination here described have shown that the separated crystals contain no member of the family of organic bases, and no copulated compound which is decomposable by acids into a carbohydrate and a second decomposition product, or by alkalies, can be broken up into an acid and a copulated carbohydrate, we have to do with *an indifferent vegetable substance*, upon whose nature only an extended investigation can afford a conclusion.

There are substances in the vegetable kingdom which must be reckoned among the *copulated compounds*, but which do not afford a carbohydrate by splitting up by either acids or alkalies, for example, athamantine. But as such bodies break up into two products by the action of acids and alkalies, we are already acquainted with their behaviour and nature by the attempts made to decompose them into a carbohydrate and a second body.

When we are thus far acquainted with the crystals, we proceed to the examination of the *mother liquor* from which they have separated, which must always contain still a little of the substance which has crystallized out, as it is impossible for the separation to be total when it has been accomplished merely by crystallization. But if originally no crystals have separated, the *entire amorphous residue* must be examined which was obtained after the treatment of the watery decoction with sugar of lead and subacetate of lead, and sulphuretted hydrogen, and evaporation.

It has been previously mentioned that we must endeavor to separate this residue, when it has been suitably concentrated and treated with alcohol, into a soluble and an insoluble portion, and also to treat the alcoholic solution with ether, to ascertain whether one or more constituents are thereby precipitated.

By the treatment of the aqueous decoction with animal charcoal it has been ascertained whether bodies are contained therein which are fixed by animal charcoal or not. When such bodies have been detected in the decoction by means of animal charcoal, we must simplify the method of examining the residue in question of the watery decoction which has been precipitated with acetate and subacetate of lead by the application of animal charcoal. If this residue has been treated with alcohol, and thereby a separation has been effected into a part soluble and a part insoluble in alcohol after the evaporation of the alcohol from the part therein insoluble, and the distillation of the alcohol from the part therein soluble, both the resulting residues are separately dissolved in water and treated with animal charcoal. When a precipitate has formed by the addition of ether to the alcoholic solution of a part of the residue, this precipitate, after it has been collected on a filter, as well as the residue of the filtered liquid freed from alcohol and ether, are dissolved in water, and the solutions treated with animal charcoal. The animal charcoal, as before described, is quite exhausted with alcohol to obtain a solution of the body which it has retained, which, after distilling off the alcohol, is examined

for the presence of organic bases and copulated compounds in the same manner as described for the crystals, which sometimes are deposited from the watery decoction after treatment with sugar of lead, subacetate of lead, and sulphuretted hydrogen, and evaporation. As neither all coloring matters nor all bitter principles and organic bases are retained by animal charcoal when their watery solutions are placed in contact with it, a separation of two coloring matters, two bases, or two bitter principles, can often be effected by charcoal, which can only with difficulty be accomplished in other ways.

The further examination for the presence of organic alkaloids, copulated carbohydrates and indifferent organic compounds, is now undertaken in the manner, just now described for the crystals, with those portions which had been absorbed by and were redissolved from charcoal, and with those bodies which remain dissolved in alcoholic ether, and which were precipitated by ether from the alcoholic solution.

In most parts of plants *sugar* is contained which passes into the decoction by boiling with water. It is neither precipitated by sugar of lead nor subacetate of lead, and therefore remains dissolved in the fluid which has been filtered from the precipitate, and freed from lead by sulphuretted hydrogen, and concentrated by evaporation. As this residue always contains acetic acid in rather considerable quantity, derived from the employment of the acetates, the sugar never crystallizes out. At least I have never obtained sugar in this way. By treating this residue with alcohol the sugar dissolves therein, and the acetic acid likewise goes over to the alcohol. On the addition of much ether, the sugar separates from the acetous alcoholic solution as a heavy layer like turpentine at the bottom of the vessel, and adheres to its sides as a gummy covering. With the sugar, under some conditions, other bodies may be precipitated. On that account, the impure sugar is dissolved in alcohol, and mixed with a strong solution of potash. The sugar compound of the potash separates, and most of the other substances remain dissolved in the alcohol containing potash. Whether cane sugar or grape sugar is contained in the watery decoction is not ascertained by this method of proceeding. This may be less easily discovered by the treatment of the watery decoction than by the examination of the spirituous extract of the material under examination. Of this matter we shall speak further on.

It must be observed here, that alcohol will take up almost always the organic bases or their acetates, as well as the copulated carbohydrates, from the residue of the aqueous decoction, left after its treatment with acetate and subacetate of lead and sulphuretted hydrogen. Such bodies are only in exceptional cases found in that portion not dissolved by alcohol: but are frequently precipitated by ether from their alcoholic solution, and are then in most cases intermixed with sugar.

Very frequently a body is contained in the alcoholic extract of the reei-

due in question of the watery decoction which is not precipitated by ether because it is soluble in a mixture of ether and alcohol. Its presence may be easily recognized when the residue which remains after the expulsion of the ether and the alcohol is treated with moderately diluted hydrochloric acid. The fluid becomes turbid when a little of this body is present, and a separation of oily globules on the surface of the acid fluid ensues, and a separation of resinous flocks when it exists in larger quantity, takes place, diffusing a peculiar odor of an ethereal oil. I have met with this substance in plants of the most varied families, so that it may be recognized as one of the most widely-spread constituents of the vegetable kingdom, although it does not exist in all plants. This substance was found by Kawalier in the *Pinus sylvestris*, and analyzed by him, and termed *pinipicrine*. It is a copulated carbohydrate, which is broken up by hydrochloric acid into sugar and an ethereal oil, of which the great part becomes a resin when separated.

As the precipitates which sugar of lead and subacetate of lead produce in the watery decoction of the material under examination are not absolutely insoluble in water, it is intelligible that always after the separation of the lead by sulphuretted hydrogen a fluid is obtained, and by the concentration of the fluid a residue results which contains small quantities of those substances, the bulk of which were precipitated by the salts of lead above named; so that indeed by the addition of a little subacetate of lead always a little precipitate forms in this residue, though not much. When these small quantities of dissolved substances are impeding the separation of other bodies, they must be removed by subacetate of lead, and the lead then separated by sulphuretted hydrogen.

We often find it stated in accounts of analysis that the sugar of the watery decoction, which frequently acts very injuriously in the investigation of the other constituents, must be destroyed by fermentation with the aid of yeast.

But a removal of the sugar in this way can only give occasion too easily to delusions. When no constituents are present which undergo in contact with yeast a splitting up, the constituents still may be decomposed by the yeast and the fermenting sugar. It has been long known that urea, which is not decomposed by yeast, breaks up into carbonic acid and ammonia when it is in a solution of sugar which is set with yeast into fermentation. Other substances also may be decomposed in a similar way when they are contained in a fermenting solution of sugar. On that account this destruction of the sugar by fermentation must only be undertaken as an aid for the isolation of one or more constituents when it has been already discovered that none of the constituents undergo by this method a splitting up or an alteration.

The precipitate which was obtained by sugar of lead in the watery decoction never probably contains an organic base; on the contrary, one or

(To be continued.)

Varieties

Soda.—This is a most important manufacture. Few changes in the principle of manufacture have taken place during the last ten years, the essential points of the original method of Leblanc (1798) being still adhered to. The extent of the manufacture has largely increased since the year 1851. The value of alkali made annually in England is 2,000,000*l.*; of this half is made in South Lancashire and half in the Newcastle district. The following statistics apply to the South Lancashire alkali trade, per week, in 1861:—Common salt decomposed per week, 2600 tons; sulphuric acid used, 3110 tons; soda ash sold per week, 1800 tons; salt cake sold per week, 180 tons; soda crystals ditto, 170 tons; bicarbonate soda ditto, 225 tons; and caustic soda ditto, 90 tons. Since 1852 the alkali trade of South Lancashire had more than tripled. The large quantity now produced was manufactured in about twenty-five works, chiefly situated at St. Helen's, Runcorn Gap, Widnes Dock, near Warrington, the neighborhood of Bolton, and Newton Heath. None of the patents for improving the manufacture of alkali had changed the process materially. The improvements of detail since 1851 have been the following:—1. Greater attention to economical working in all the branches. 2. The process of lixiviation of black ash is more completely accomplished than formerly by the arrangement of Mr. Shanks. 3. In some works the black ash is now made by machinery. 4. The soda is now in many alkali works packed in casks by machinery. Since 1851, a new branch of the manufacture has been introduced by the preparation of solid caustic soda, which is largely exported to America and other places. The proposition recently made by Kuhlmann for the employment of the alkali waste as a cement is a very old idea, Mr. Deacon, of Widnes, having used it for making floors for twenty years. In conclusion, the report recognised the important additions to our knowledge of the theory of soda manufacture made by Mr. Gossage. —*London Chem. News*, Sept. 21, 1861.

New Formulæ for Sinapisms.—M. Grimault recommends the following formulæ:—Pure Glycerine $3\frac{1}{2}$ drachms, starch 5 drachms, and volatile oil of mustard 20 drops; and M. Chevallier publishes the following formula for what he terms *Plastic Sinapisms*:—Volatile oil of mustard 20 drops, white pitch 15 drachms. Having melted the pitch, remove it from the fire, stir in the volatile oil, and spread on leather. By the addition of 10 per cent. of resinous oil, the mass can be spread on linen like ordinary adhesive plaster. For use, a piece can be cut off according to the size of the part to which the sinapism is intended to be applied. The effect is very

speedy, and the proportions of the active principle may be varied.—*Journal de Chimie Méd.*, June, p. 357.—*Medical Times and Gazette*.

Chlorate of Potash for Fœtid Breath.—In the majority of cases, fœtid breath arises from derangement of the stomach: and for such cases, an Italian medical journal recommends the following remedy. Three hours after each meal take a teaspoonful of a solution of 6 grammes of chlorate of potash in 120 grammes of sugared water (about a drachm and a half in four ounces): and at the same time rinse the mouth with the mixture.—*Dublin Medical Press*.

Solubility of Arsenious Acid in Glycerin.—M. Cap has directed the attention of Pharmaceutists to the solvent power of glycerin for arsenious acid. Equal equivalents of the two substances combine, yielding a viscous oil which solidifies at the freezing point (32° F.), when it presents the appearance of an ordinary fat.—*London Pharm. Journ. and Trans.*, Oct. 1, 1861.

On the Precipitation of Lime from Saccharine Juices by Bone-Black, by E. F. ANTHON.—The application of bone-black in the refining of sugar, when first introduced, purposed the precipitation of certain organic matter, such as coloring and putrefying substances from their solution, a purpose for which it is eminently fitted. Nor were the expectations of its success disappointed, for up to the present day, animal charcoal remains one of the most important agents in the refining of the various kinds of sugar; though, as regards the end for which it is employed, this is at present a very different one, being not the separation of organic matter, but the precipitation of the lime held in combination by the sugar. More than twenty years ago, I called attention to the fact, that the property of charcoal to precipitate organic matter from its solutions was more or less materially impaired by the presence of alkalies, that for instance a quantity of coal which had absorbed some coloring matter from a slightly acid or a neutral liquid, gave the same up to an alkaline liquid, (after been having previously washed with water). The saccharine solution of lime is necessarily of a strongly alkaline reaction, the more so since its combination with the juice unavoidably causes the presence of other fixed alkalies.

For these reasons it has always appeared to me irrational to attribute to bone-black, besides its well acknowledged decolorizing properties, also that of removing the lime—properties evidently antagonistic, as the purpose to which they are employed is to be attained at one and the same time, and it is quite natural to find either the one or the other end more completely reached at the expense of the other.

The questions which I determined to solve by practical experiment, the results of which follow in a condensed form, are the following:

1. Whether the property of precipitating the lime is due to the pure charcoal, or to its earthy ingredients,—or
2. To atmospheric carbonic acid, as condensed in the pores of the bone-black ;—
3. What quantity of lime may be taken up by the bone-black ;—and
4. What proportion of the lime held in solution is removed from it by varying proportions of bone-black.

The answers to which, so far as proved by my experiments, are as follow :

The earthy ingredients of bone-black contribute in no wise to its property of absorbing lime.

This property, however, is not due to the pure animal coal, but to the condensed carbonic acid, and hence the power of removing the lime is in direct proportion to the amount of carbonic acid absorbed in its pores.

Freshly calcined, this property is but slightly developed, but increases distinctly when the charcoal is exposed to the action of the atmosphere or to carbonic acid, and if to the former under, favorable circumstances, it reaches its maximum in less than ten days.

Not more than three fifths or two-thirds of the lime held in solution can be precipitated by bone-black under the most favorable circumstances. The largest amount of lime absorbed by the charcoal amounted to 4.4 per cent. of its weight which is equal to 3.45 per cent. of condensed carbonic acid.

In connexion with these experiments, Mr. Anthon noticed the formation of formic and hydrocyanic acid in thoroughly purified animal charcoal, which had been kept for four years in a not very tightly closed bottle, as well as the absorption of a large proportion of water, the loss of this charcoal by heating amounting to as much as sixteen per cent.—*American Druggists' Circular and Chemical Gazette, from Dingler's Journal.*

Another new Alkali Metal.—Whilst investigating the new metal *cæsium*, Bunsen has lately discovered another metal, which seems to resemble potassium as closely as *cæsium* does. It has a very high atomic weight, its hydrate is deliquescent and highly caustic, its carbonate is strongly alkaline, and its nitrate anhydrous like nitrate of potassa, but, unlike that salt its crystalline form is hexagonal. It was obtained from the saline residue from 44,000 kilogrammes of Dürkheim water, and subsequently from *lepidolite*.—*Chemist and Druggist.*

Platinum Coating for Porcelain Crucibles.—Elsner gives the following (*Elsner's Chem. Tech. Mittheilungen*, 1859-60, s. 124) as a method by which a strong covering of metallic platinum may be given to porcelain vessels. Platinum-black is rubbed up with oil of turpentine, and the mixture is painted over the object to be coated, made red-hot. The vessel coated is then enclosed in a capsule, and well burnt in a furnace, after which it will be found perfectly covered with a strongly fixed covering of metallic platinum.

Platinum black was found to be fusible in the strongest heat of the furnace oven in the Royal Porcelain Manufactory at Berlin.—*Chem. News, London.*

Abstract of the Minutes of the Philadelphia College of Pharmacy.

At the Semi-Annual Meeting of the College, held 9th mo. 30th, 1861. The President, Charles Ellis, in the Chair.

The Minutes of the Board of Trustees inform of the Election of Augustus Neynaber to resident membership; also, that the degree of Graduate in Pharmacy was conferred upon Theophilis Fischer, after the semi-annual examination in July.

The following Report was read and accepted. On motion, a unanimous vote of thanks was tendered the Committee for their services.

The Committee on the Herbarium respectfully report: That they commenced their labors during the past six months, by completing the arrangement of the herbarium, and adding to it the plants contained in several smaller collections. They have likewise given attention to the mounting of the official plants of the herbarium, but have not been able to finish this work; there are still quite a number of specimens to be mounted. Others mounted last winter might be exchanged for better specimens collected since.

The Committee are gratified to state that they have been materially aided by the botanical works added to the library by the Board of Trustees, viz: Kittel's Flora of Germany, Chapman's Flora of the Southern United States and De Candolle's Prodrômus. The microscope has likewise arrived, and its use has been, entirely satisfactory; it is intended to employ it frequently during the coming winter. A few interesting botanical objects have been mounted by us during last summer, and more may be mounted the coming winter. By gradually increasing these objects, as time and opportunity offers, the College may ultimately become possessed of a valuable cabinet, suitable for the microscopic study of botany and of the various specimens of materia medica, together with their adulterations and impurities.

From the 30th of March to the 14th of September we have made 29 botanical excursions, and collected more than 400 different species and varieties of plants, of which about 180 had not been collected during the year 1860, and some of which had not heretofore been in the College herbarium. It affords us pleasure to say that several members of the College, not members of the committee have occasionally supplied us with plants growing at a distance from this city, thus proving an increased interest in botany, and we cannot but wish that others may hereafter show a like regard for the herbarium, which, though embracing a considerable number of species, is yet far from a complete collection of even the plants growing in our own State. Among the contributions we have to notice that from Professor Procter, being a collection of Cuban plants, among which are several official in our own Pharmacopœia, and others employed in their native country for the cure of disease.

We have found spontaneous and fully naturalized in our immediate neighborhood the following plants, which are natives of the Southern States, or of foreign countries, and have, we believe, heretofore, not been

generally noticed in the wild state in our section : *Hesperis matronalis*, Lin., *Hibiscus Syriacus*, Lin., *Philadelphus inodorus*, Lin., *Fedia alitaria*, Vahl., *Helianthus tuberosus*, Lin., *Ligustrum vulgare*, Lin., *Convallaria majalis*, Lin., and *Tradescantia Virginica*, Lin. We have likewise made the attempt of naturalizing several foreign medicinal plants in the woods and meadows near Philadelphia, and may perhaps report on them in a few years. It would be desirable for the committee to have some fresh seeds at their disposal, as we have had applications from other localities for such, and we conceive the naturalization to our soil of useful plants, an undertaking well worthy the efforts and the influence of the College, whose attention deserves likewise to be directed to such of our indigenous plants as manifestly decrease in number. We may instance, *Polygala senega*, Lin., which notoriously becomes scarcer every year, and we believe, is now not to be found in our neighborhood. The eradication of such valuable medicinal plants, is, of course, not countenanced by intelligent pharmacutists ; it is, perhaps, chiefly to be attributed to collecting the roots at improper seasons, and we have, therefore, a remedy against it, insufficient though it may be, by refusing all roots not gathered in proper time. But while it will be judicious to attempt a propagation, not a culture of this and similar plants, it would probably be advisable to keep an eye on substitutes. In this connection, we would direct attention to the fact that *Saponaria officinalis*, Lin., has been completely naturalized in our soil, and grows very frequently in some places in the vicinity of Philadelphia, so frequent indeed, that here and there it may be regarded as an obnoxious weed. Could not this plant, which contains saponine, a principle analogous to the polygalic acid of *senega*, furnish a partial substitute for the latter?

Veratrum viride, Ait., has within a few years past gained considerable reputation for its valuable medicinal properties. The plant is scarce in our neighborhood ; indeed we know of but a single place where about a dozen specimens flourish. It would be but half an hour's work to exterminate it there ; is it, however, not more consistent to transplant it to other places where it would be likely to increase ?

We believe that the attention of the intelligent pharmacist need be but directed to such cases, to instigate him to experiments with the view of increasing the supply of certain plants without resorting to cultivation.

We have had a fair prospect of receiving exchanges from various sections of our country but the political affairs have operated against such an intercourse. Still we are pleased to announce that we have received a small instalment of plants, from Mr. Charles A. Heinitsch, of Lancaster, Pa., with the offer of sending more during the Fall ; as yet we have not made any returns for these contributions.

A few weeks ago, we sent collections of plants, all gathered this year, to Dr. A. Flückiger in Bern, Professor G. Theobald, in Chur, and to Professor A. Buchner, in Munich. At the request of Dr. Flückiger, we applied to Professor Jos. Henry, to have them transmitted through the Smithsonian Institution. They have confined their transmissions to books, however, because the addition of specimens of natural history to the invoice, would complicate, very much, the passage of the boxes through the Custom Houses abroad. No other good opportunity offering, we sent these three packages through Messrs. Schafer and Koradi, of this city ; but have omitted to enclose any specimens of drugs, &c., promising to Dr. Flückiger, to enclose them next spring, when we should be able to send a more extensive selection from the College Herbarium. It is desirable that the members of the College should contribute some of our American drugs, which the committee have not been able to collect,

and which will benefit the College, by the receipt of European drugs in exchange.

The labors of the provisional committee on the herbarium will cease this evening, the election of a standing committee being now directed by the By-Laws. We beg leave to point out the following work left for the standing committee: Distributing the contributions received during the summer in the herbarium; examining more carefully the doubtful plants; mounting the officinal plants on boards; and selecting plants for Dr. Flückiger, in Bern, and for Mr. Daniel Hanbury, in London, the latter of whom has kindly offered to procure exchanges for us. With proper and judicious management, the College Herbarium will in a short time become a valuable botanical cabinet, embracing specimens from various parts of the world. We must, therefore, endeavor to obtain soon our North American plants, and to enter into correspondence with Central America, and the West Indies. From the latter islands we are likely to receive some specimens in a short time, partly through the kindness of Mr. E. Durand, who has interested himself in determining the source of bay-rum and is now able to corroborate the inference expressed in a late paper on this subject, that bay-rum is derived from *Myrcia acris*.

All of which is respectfully submitted.

J. M. MAISCH, Chairman.

The following resolution was offered by Edward Parrish, seconded by Dr. R. P. Thomas, and freely discussed by several members. It was unanimously adopted.

Resolved, That a Committee of 16 be appointed to obtain specimens of our indigenous materia medica, and of the officinal preparations made according to the processes of the Pharmacopœia of 1860, as far as these have been decided on, and to send a collection of these on behalf of the College, to the exhibition of the products of all nations to be held in London, in 1862, and that this committee have power to add to their number, and to proceed in the matter as they may find expedient on behalf of the College.

On motion it was directed that the President of the College should be one of the committee, and should appoint his colleagues. The following were then appointed.

Edward Parrish, *Chairman*,

Thomas P. James,

William Procter, Jr.

Fred'k. L. John,

John M. Maisch,

James T. Shinn,

Charles Bullock,

William R. Warner,

Charles Ellis,

Dr. Robert Bridges,

Dr. R. P. Thomas,

Alfred B. Taylor.

Thomas S. Wiegand,

William Evans, Jr.

William C. Bakes,

John E. Carter.

The semi-annual Election for Trustees and Committees was ordered: James T. Shinn and W. J. Jenks, acting as tellers. They reported the following as elected.

Evan T. Ellis,

W. J. Jenks,

A. B. Taylor,

W. Evans, Jr.

Charles Bullock,

W. H. Pile,

J. M. Maisch,

W. C. Bakes.

*Committee on notices of deceased Members.*E. Parrish, *Chairman*,

W. Procter, Jr.

C. Bullock.

*Committee on Herbarium.*J. M. Maisch, *Chairman*

W. R. Warner,

G. J. Scattergood.

Then on motion adjourned.

Edward Parrish, *Secretary*.

Editorial Department.

THE GREAT EXHIBITION OF 1862 AT LONDON.—At the last meeting of the Philadelphia College of Pharmacy, Committee was appointed to collect specimens of the materia medica, and to prepare pharmaceutical preparations with the view of making a deposite in the proposed "World's Fair" next year that will illustrate the extent of our medicinal resources, and the quality of the preparations which our pharmacutists have to offer to the physician. The resolution and the list of the Committee to whose attention it was committed, will be found at page 574. Our object in bringing it forward in this place is to call the attention of our pharmaceutical friends at a distance to this work, and invite them to assist incidentally in aiding the Committee in obtaining specimens not easily reached in this locality. The specimens of materia medica intended are strictly those of indigenous growth, including all medicinal plants native to the United States that can be procured, and those naturalized plants that flourish readily here, of importance in medicine, as Belladonna, Hyoscyamus, etc. It is desirable to illustrate roots by specimens of the plants that yield them, or their fruits, or leaves, as the case may be, and thus add to the interest of the collection. It is to be regretted that this idea had not been stated earlier, so that many of the herbaceous plants now out of season, and difficult if not impossible to procure in commerce, might have been included. Should this project be carried out successfully, it will present to the pharmacologists of England an opportunity for studying American drugs never before so thoroughly afforded.

THE NEW YORK COLLEGE OF PHARMACY.—For several years past the Trustees of this Institution have committed the tuition of its School of Pharmacy to Dr. Doremus, of the New York Medical College, on chemistry; and Professor Thurber, now of the University of Michigan, on pharmacy and materia medica. These gentlemen having resigned their connection with the school, the Trustees have appointed two pharmacutists to the vacant professorships; viz.: Mr. John M. Maisch, of Philadelphia, well and favorably known by his numerous contributions to the American Journal of Pharmacy, as Professor of Materia Medica and Pharmacy;

whilst the chair of chemistry has been committed to Mr. Ferdinand F. Mayer, of New York. We cannot but congratulate our New York friends upon this new step, by which they have secured the services of two capable and energetic pharmacutists. The untiring assiduity and the ability displayed by Mr. Maisch, in his connection with our College operations, leads us to believe that in his new sphere of action he will prove eminently useful to the cause of pharmaceutical education; and, while regretting his removal from amongst us, we cannot but feel gratified that his sphere of usefulness is enlarged, and that his success in life will be promoted.

THE MARYLAND COLLEGE OF PHARMACY.—Since the session of the last winter we were sorry to hear that Dr. Steiner, the Professor of Chemistry in this College, having removed his residence to Frederick City, has resigned his connection with the College. By a circular recently received we are informed that Mr. Alfred M. Mayer has been elected to the vacant chair of chemistry. The lectures will be conducted as heretofore at the College Hall, 47 North Calvert street, Baltimore.

THE BRITISH EAST INDIAN EXPERIMENT IN THE CULTURE OF CINCHONA.—Through the last Pharmaceutical Journal, we learn that the plants taken to India by Mr. Markham have all died, owing, it is supposed, to the exposure to severe weather, in being carried across the Andes to the port of embarkation. A new attempt is now being made with plants of the gray and yellow bark, and some seeds. Mr. Markham states in a letter to the *Madras Times*, “that a further supply of plants and seeds is expected from Eucador, and that arrangements have been made with duly qualified agents to continue sending supplies of both as long as they may be necessary.” It is also said that attempts will be made to naturalize the plant in the hills of Jamaica and Ceylon. The success of the Dutch in Java, where they already have half a million of plants growing thriftily—chiefly of the *Calisaya* variety—is very encouraging, especially as the percentage of quinia yielded by the Javan plant seems greater than that obtained from the South American bark. Dr. McPherson, in a recent visit to the plantation, was jealously prevented from bringing away a single plant.

ON THE DETECTION OF STRYCHNIA AS A POISON, AND THE INFLUENCE OF MORPHIA IN DISGUIISING THE USUAL COLOR-TESTS, by John J. Reese, M. D. of Philadelphia, (from the American Journal of Medical Science.) The reception of the above pamphlet from the author, as we are closing our form, is acknowledged, and we hope in a future number to make an abstract. The author arrives at the conclusion that the presence of morphia in an equal quantity so modifies the action of the color-test of strychnia, as to render it less perfect than has been thought—but that it in nowise interferes with Marshall Hall’s frog-test. This is important information, as the cotemporaneous administration of these alkaloids is not unfrequent.

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